RAVEN'S' RULES

Raven's Rules are meant to be a deep dive into the new ELD section of the Federal Hours of Service. I have included the regulatory sections, the Technical Standard sections and the suggested Federal ELD Penalty guide.

No information has been peer reviewed or reviewed by any regulatory body and is my opinion based on my research and experience. If I have missed anything or a error is noticed please let me know, I'm learning new things every day.

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FUNCTIONALITY

This section focuses on the functionality of certified ELDs for commercial vehicles. ELDs automatically record driving time and facilitate the recording of driver duty status. The devices are certified by accredited bodies and meet the Technical Standards.

ELDs are used by both drivers and authorized support personnel. They can be implemented as a standalone device or integrated within other modules. While ELD devices may vary in features and user interfaces, their core functionality remains consistent for monitoring hours of service.

ELDs are designed to synchronize with the vehicle's engine, record essential data, generate standardized output files such a PDF and CSV files, and allow for manual inputs. The interface with the engine can be achieved through either hardwired or wireless connections.

Understanding the functionality of ELDs is crucial for compliance and improving the efficiency and safety of operations. Adherence to the current Hours of Service regulation by utilizing a ELD to record a driver's duty status is the law.

1.1 ELD Function1.2 System Users1.3 System Architecture1.4 System DesignBluetooth vs. Wired4.2 ELD-Vehicle Interface

Functionality

77 (1) A motor carrier shall ensure that each commercial vehicle that it operates is equipped with an ELD that meets the requirements of the Technical Standard and shall ensure that it is mounted in a fixed position during the operation of the commercial vehicle and is visible to the driver when the driver is in the normal driving position.

Interpretation

The following definitions apply in the current Hours of Service Regulations:

electronic logging device or ELD means a device or technology that automatically records a driver's driving time and facilitates the recording of the driver's record of duty status, and that is certified by an accredited certification body under section **79.1**.

1.1 ELD Function

The ELD discussed in the Technical Standard is an electronic module capable of recording the electronic records of duty status (RODS) for Commercial Motor Vehicle (CMV) drivers using the unit in a driving environment within a

CMV and meets the compliance requirements in the Technical Standard.

1.2 System Users

Users of ELDs are:

- a) CMV drivers; and
- b) Support personnel who have been authorized by the motor carrier to:
- (1) Create, remove, and manage user accounts.
- (2) Configure allowed ELD parameters; and
- (3) Access, review, and manage driver ELD RODS on behalf of the motor carrier.

1.3 System Architecture

An ELD may be implemented as a stand-alone technology or within another electronic module. It may be installed in a CMV or may be implemented on a handheld unit that may be moved from vehicle to vehicle. It may also incorporate a software application interface that can be used by the drivers and the support

personnel. It may also allow data interchange with other software applications implemented by the motor carrier. The functional requirements are the same for all types of system architectures that may be used in implementing the ELD functionality.

Raven's Rule: ELD devices do not work exactly the same. The functional requirements are the same for all ELDs but, the specific features and user interfaces can vary depending on the manufacturer and the specific device. Different ELD devices may have different hardware, software, and user experience, but they are all designed to meet the regulations and capture the required data for monitoring drivers' hours of service. So, while the core functionality is consistent, there may be variations in the specific implementation and user experience among different ELD devices.

1.4 System Design

a) An ELD is integrally synchronized with the engine of the CMV such that driving time can be automatically recorded for the driver driving the CMV and using the ELD.

b) An ELD allows for manual inputs from the driver and the motor carrier support personnel and automatically records date and time, vehicle position, and vehicle operational parameters.

c) An ELD records a driver's electronic RODS and other supporting events (as defined in **3.1.2** of the Technical Standard) with the required data elements specified in the Technical Standard and retains data to support the performance requirements specified in the Technical Standard.

d) An ELD generates a standard ELD output file and transfers it to an authorized safety official upon request.

e) The Technical Standard specifies minimally required data elements that must be part of an event record such that a standard ELD output file can be produced by all compliant ELDs.

SCHEDULE XVIII

(Sections 1 to 4)

Motor Vehicle Transport Act

Commercial Vehicle Drivers Hours of Service Regulations

77(1) Failure to ensure commercial vehicle is equipped with ELD as required is \$1000.00.

78(1) Failure to ensure ELD operates in good working order and is calibrated and maintained is \$1000.00.

Bluetooth vs. Wired

4.2 ELD-Vehicle Interface

a) An ELD must be integrally synchronized with the engine of the CMV. Engine synchronization for purposes of ELD compliance means the monitoring of the vehicle engine activity to automatically record the engine power, vehicle motion, total distance driven, and engine hours when the CMV engine is powered.

b) If the CMV's engine has an ECM, the ELD device must establish a link to the engine ECM when the engine is powered on and must automatically receive the engine power status, vehicle motion, total distance and engine hours by the vehicles ECM.

But,

If the CMV does not have an ECM or any required data cannot be captured from the ECM, an ELD must use alternative sources to obtain or estimate these vehicle parameters, with the listed accuracy requirements under **4.3.1** of the Technical Standard.

The ELD device must use alternative sources to obtain or estimate these vehicle parameters with the listed accuracy requirements under **4.3.1** of the Technical Standard. **4.3.1** of the Technical Standard is ELD Sensing which is: Engine Power, Vehicle Motion, Vehicle Distance, Engine Hours, Date and Time, CMV Position, CMV VIN. There is no information regarding the alternative source criteria. Just that it must be within the same accuracy as the standard.

Raven's Rule: There are two ways to connect the ELD device to the ECM.

The first is a hardwired direct connection. In this case, the ELD device is directly connected to the ECM, usually through a physical cable. This method requires some additional installation work initially, but it provides a more stable and reliable connection to the ECM. With a hardwired connection, the ELD device is typically mounted in a fixed position inside the CMV, and it's not meant to be taken out. However, if a docking station is used, the ELD can be undocked and taken out of the CMV while still staying connected to the ECM. The docking station records and stores the ECM information this allows the driver to leave the CMV with the ELD device. When the driver returns, re-dock the tablet, and the ELD and ECM will synchronize.

The second way to connect your ELD device is wirelessly. In this scenario, the ELD device communicates with the ECM using wireless technology, such as Bluetooth or Wi-Fi. This eliminates the need for a physical cable connection, providing more flexibility for the driver to move around with the ELD device. However, wireless connections may not be as stable or reliable as hardwired connections, and they may require a separate device or module to facilitate the wireless communication between the ELD device and the ECM.

Accounts

78.1 of the current Hours of Service is the requirements for motor carriers to establish and maintain a system of accounts for ELDs. These accounts serve two main purposes: allowing drivers to record their duty status in a personal account and providing a separate account for unidentified drivers. This establishes the foundation for an efficient accounts system that is compliant with the current Hours of Service regulations and ensures the integrity of ELD data.

This section explains how to configure ELDs for exempt drivers and introduces the concept of an "unidentified driver." It details the requirements for account creation, security, and management, emphasizing data confidentiality and accurate record-keeping. Compliance with the Technical Standard does not require interoperability between ELD providers.

- 3.1.3 Configuration of user account exempt from using an ELD
- 3.1.6 Unidentified Driver
- 4.1.2 Account creation
- 4.1.3 Account Security
- 4.1.4 Account Management
- 4.1.5 Non-Authenticated Driving of a CMV

Accounts 78.1

78.1 A motor carrier shall create and maintain a system of accounts for ELDs that is in compliance with the Technical Standard and that

(a) allows each driver to record their record of duty status in a distinct and personal account; and

(b) provides for a distinct account for the driving time of an unidentified driver

3.1.3 Configuration of user account exempt from using an ELD

As specified in **4.3.3.1.2** of the Technical Standard, an ELD must allow a motor carrier to configure an ELD for a driver who may be exempt from the use of an ELD. An example of an exempt driver would be a driver driving under the shorthaul exemption under the current Hours of Service regulations. Even though exempt drivers do not have to use an ELD, an ELD equipped CMV may be shared between exempt and non-exempt drivers and motor carriers can use this allowed configuration to avoid issues with unidentified driver data diagnostics errors.

3.1.6 Unidentified Driver

"Unidentified Driver" refers to the driving of a CMV equipped with an ELD without an authenticated driver logged in to the ELD. Functional specifications in the Technical Standard require an ELD to automatically record driving time attribute the records to the unique "Unidentified Driver account," as specified in **4.1.5** of the Technical Standard, until the motor carrier and the driver review the records and they are assigned to the true and correct owner.

4.1.2 Account creation

a) Each user of the ELD must have a valid active account on the ELD with a unique identifier assigned by the motor carrier.

b) Each driver account must require the entry of the driver's license number and the jurisdiction that issued the driver's license into the ELD during the account creation process. The driver account must securely store this information on the ELD. c) An ELD must not allow creation of more than one driver account associated with a driver's license for a given motor carrier.

d) A driver account must not have administrative rights to create, remove or manage user accounts on the ELD, or to configure allowed ELD parameters.

e) A support personnel account must not allow recording of ELD data for its account holder.

f) An ELD must reserve a unique driver account for recording events during nonauthenticated driving of a CMV. The Technical Standard will refer to this account as the "unidentified driver account."

4.1.3 Account Security

a) An ELD must provide secure access to data recorded and stored in the ELD by requiring user authentication.

b) Driver accounts must only have access to data associated with that driver, protecting the authenticity and confidentiality of the collected information.

4.1.4 Account Management

a) An ELD must be capable of separately recording and retaining ELD data for each individual driver using the ELD.

b) An ELD must provide for and require concurrent authentication for team drivers.

c) If more than one ELD unit is used to record a driver's electronic RODS within a motor carrier's operation, the most recent ELD the driver is using must be able to retrieve, retain and produce a complete ELD RODS for that driver, on demand, for the current day and each day during the required previous days as per current Hours-Of-Service regulations. For purposes of ELD compliance to the Technical Standard, there is no requirement for interoperability between ELD providers.

4.1.5 Non-Authenticated Driving of a CMV

a) An ELD must associate all non-authenticated driving of a CMV with a single ELD account labeled unidentified driver.

b) If a driver has not authenticated into the ELD, as soon as the vehicle is in motion, the ELD must:

(1) Provide a visual or visual and audible warning reminding the driver to stop and authenticate into the ELD.

(2) Record accumulated time for driving and on-duty not-driving statuses under the unidentified driver profile, in accordance with the ELD defaults described in **4.4.1** of the Technical Standard.

and

(3) Not allow entry of any information into the ELD other than a response to the driver authentication prompt.

Raven's Rule: 78.1 refers to the system of accounts that motor carriers must create and maintain for the ELD that meet the Technical Standard. The first requirement is that each driver should have a distinct and personal account to record their record of duty status. The second requirement is to have a distinct account for the driving time of an unidentified driver. This is important in situations where multiple drivers may use the same ELD-equipped commercial motor vehicle (CMV) and allows motor carriers to avoid issues with unidentified driver data diagnostics errors. If a driver is exempt from using an ELD, such as those driving under the short-haul exemption, the driver does not have to use an ELD, but the ELD-equipped CMV can still be shared between exempt and nonexempt drivers. The "unidentified driver" refers to a CMV with an ELD that is driven without an authenticated driver logged into the ELD. The ELD is required to automatically record the driving time and attribute it to the unique "Unidentified Driver account" until the records are reviewed and assigned to the correct driver. Each user of the ELD must have a valid active account with a unique identifier assigned by the motor carrier. The driver's license number and the jurisdiction that issued the license must be entered during the account creation process. An ELD must not allow creation of multiple driver accounts associated with the same driver's license for a given motor carrier.

ELD accounts must have secure access to the data recorded and stored in the ELD, requiring user authentication. Driver accounts should only have access to data

associated with their specific account to protect the authenticity and confidentiality of the collected information. ELDs must be capable of recording and retaining data for each individual driver, including team drivers. If multiple ELD units are used, the most recent one being used by the driver should be able to retrieve, retain, and produce a complete electronic records of duty status (ELD RODS) for that driver, on demand, for the current day and previous days as required by the current Hours of Service regulation. Interoperability between different ELD providers is not required for compliance with the Technical Standard

SCHEDULE XVIII

(Sections 1 to 4)

Motor Vehicle Transport Act

Commercial Vehicle Driver'ss Hours of Service Regulations

77(4) Failure to ensure ELD is configured to allow authorized driver to indicate yard moves is \$600.00

77(6) (a) Use more than one ELD at same time is \$1000.00

(b) Request, require or allow driver to use more than one ELD at same time \$2000.00

78.1 Failure to create and maintain system of accounts for ELDs is \$1000.00

PDF HEADER PAGE AND GRID

The header pager and the grid are consistent with all ELD devices and all providers. This section will review all the required information found on a PDF header page and grid.

PRINTED PDF HEADER

Date of RODS	Day Starting Time	UTC Time Zone Offset	Current Location		Output File Comme	nt Current Date and Time
(MM-DD-YY)	(HH:MM:SS)	(HH:MM)	(latitude, longitude)			(MM-DD-YY HH:MM:SS)
11-19-18	00:00:00	05:00	6 km NNE Cornwall ON		Officer W. J. Thomp	son, 11-22-18 09:34:21
			(45.06, -74.68)		ID 17-0123	
Driver Name	Driver ID	Exempt Driver Status	Driver license		Co-Driver Name	Co-Driver ID
(Last, First)	(Username)	(E: Exempt, 0: No)	(No and Jurisdictio	on)	(Last, First)	(Username)
Smith, Richard	sr123456	0	SMIR-123456-01 (QC)		
Power Unit Number	VIN (Power Unit)	Total Vehicle Distance	Distance today	Cur. Total Distance	Cur. Total Engine H	ours Trailer Number
(ID or Licence No & Jurisdiction)		(Start – End of the Day)	(km)	(km)	(hours)	(ID or Licence No & Jurisdiction)
1) 12345	1) 1M2P267YSAM022445	1) 346470 - 346608	1) 138	204998	6265.4	T12345 T542356 R956471-ON
2) FF98765-QC	2) -1FUJGHDV0CLBP8896	2) 204885 - 204998	2) 113			
Carrier Name Home Terminal		Principal Place of Business				
	(Address)		(Address)			
Consolidated Truckload Inc. 1234 Industrial Street,		1234 Industrial Street,				
	Montreal, QC, H1C 1M1		Montreal, QC, H10	C 1M1		
Operating Zone	Cycle	Total Hours	Total Hours	Remaining Hours	Off-Duty Time Defer	rral (Status and time deferred)
(1, 2, or 3)	(7 or 14)	(in work shift)	(in cycle)	(in cycle)	(0: none, 1: Day 1, 2	2: Day 2 – Time deferred: HH:MM)
1	7	09:15	53:30	16:30	1 (02:00)	· · · · · · · · · · · · · · · · · · ·
	1					
Data Diagnostic Status	Unidentified Driving Records	Malfunction Status	ELD Identifier	ELD Provider	ELD Certification	ELD Authentication Value
Data Diagnostic Status (Status & Diagnostic Code)	Unidentified Driving Records (0: none, 1: active)	Malfunction Status (Status & Malfunction Code)	ELD Identifier	ELD Provider	ELD Certification	ELD Authentication Value
Data Diagnostic Status (Status & Diagnostic Code) 1 (Code 2)	Unidentified Driving Records (0: none, 1: active)	Malfunction Status (Status & Malfunction Code) 0	ELD Identifier	ELD Provider ELD Provider Inc.	ELD Certification ID ZA10	ELD Authentication Value D3A4506EC8FF566B506EC8FF566BDFBB

Header Segment 4.8.2.1.1 - The header must include the following data:

Driver Last Name 7.30 and Driver First Name 7.28

Driver ID - ELD username for the driver 7.18

Driver License Issuing Jurisdiction 7.10

Driver License Number 7.11

Last Name (for each co-driver) 7.30 and First Name (for each co-driver) 7.28

CMV Power Unit Number 7.4

7.5 CMV VIN

7.42 Trailer Number(s)

7.2 Carrier Name

7.48 Motor Carrier Address

7.36 Cycle Used

7.1 Day Starting Time

7.41 Time Zone Offset from UTC

7.26 Exempt Driver Configuration

Exempt Driver Status (E: exempt 0: No) 3.1.3

7.8 Date - 4.3.1.5 Date and Time - 4.4.3 Date and Time Conversions

7.31 Latitude

7.33 Longitude

7.43 Vehicle Distance - 4.3.1.3 Vehicle Distance

7.19 Engine Hours - 4.3.1.4 Engine Hours

7.17 ELD Certification ID

7.14 ELD Authentication Value

7.38 Output File Comment

Driver Name: Driver Last Name and Driver First Name

7.30 Last Name

Description: This refers to the last name of the individual holding an ELD account.

Purpose: Links an individual to the associated ELD account.

Source: Driver's license for driver accounts; driver's license or government issued ID for support personnel accounts.

7.28 First Name

Description: This refers to the given name of the individual holding an ELD account.

Purpose: Links an individual to the associated ELD account.

Source: Driver's license for driver accounts; driver's license or government issued ID for support personnel accounts.

Data Type: Entered during account creation and maintained by the motor carrier to reflect true and accurate information for the driver.

Driver ID: ELD username for the driver

7.18 ELD Username

Description: This refers to the unique user identifier assigned to the account holder on the ELD to authenticate the corresponding individual; the individual may be driver or a motor carrier's support personnel.

Purpose: Documents the user identifier assigned to the driver linked to the ELD account.

Source: Assigned by the motor carrier during the creation of a new ELD account.

Data Type: Specified by the motor carrier during account creation and entered by the user during user authentication.

Hours of Service 2005/313 Accounts

78.1 A motor carrier shall create and maintain a system of accounts for ELDs that is in compliance with the Technical Standard and that.

(a) allows each driver to record their record of duty status in a distinct and personal account; and

(b) provides for a distinct account for the driving time of an unidentified driver.

Driver License Jurisdiction

7.10 Driver License Issuing Jurisdiction

Description: This refers to the issuing jurisdiction of the listed Driver License for the ELD account holder.

Purpose: In combination with Driver License Number, it links the ELD driver account holder uniquely to an individual with driving credentials; ensures that only one driver account can be created per individual.

Source: Driver license.

Data Type: Entered during account creation and maintained by the motor carrier to reflect true and accurate information for the driver.

Driver License Number

7.11 Driver License Number

Description: This refers to the unique Driver License information required for each driver account on the ELD.

Purpose: In combination with driver license issuing jurisdiction, it links the ELD driver account holder to an individual with driving credentials; ensures that only one driver account can be created per individual.

Source: Driver license.

Data Type: Entered during account creation and maintained by the motor carrier to reflect true and accurate information for the driver.

Co-Driver Name: Last Name (for each co-driver) First Name (for each co-driver)

Co-Driver ID: ELD username (for each co-driver)

Driver ID: ELD username for the driver

7.18 ELD Username

Description: This refers to the unique user identifier assigned to the account holder on the ELD to authenticate the corresponding individual; the individual may be a driver or a motor carrier support personnel.

Purpose: Documents the user identifier assigned to the driver linked to the ELD account.

Source: Assigned by the motor carrier during the creation of a new ELD account.

Data Type: Specified by the motor carrier during account creation and

Power Unit Number (for each CMV driven by the Driver) or the license number and licensing jurisdiction:

7.4 CMV Power Unit Number

Description: This refers to the identifier the motor carrier uses for their CMVs in their normal course of business.

Purpose: Identifies the vehicle a driver drives while a driver'ss ELD records are recorded; Makes ELD RODS consistent with current Hours-Of-Service regulations requirements.

Source: Unique CMV identifiers a motor carrier uses in its normal course of business and includes on dispatch documents, or the license number and licensing jurisdiction of the power unit.

Data Type: Programmed on the ELD or populated by the motor carrier or entered by the driver.

CMV VIN (Power Unit)

7.5 CMV VIN

Description: This refers to the manufacturer-assigned VIN for the CMV powered unit.

Purpose: Uniquely identifies the driven CMV not only within a motor carrier at a given time but across all CMVs sold within a 30-year rolling period.

Source: A robust unique CMV identifier standardized in North America.

Data Type: Retrieved from the engine ECM via the vehicle database.

Trailer Number(s) (ID or the license number and licensing jurisdiction)

7.42 Trailer Number(s)

Description: This refers to the identifier(s) the motor carrier uses for the trailers in the normal course of business.

Purpose: Identifies the trailer(s) a driver is pulling while a driver ELD records are recorded; makes ELD RODS consistent with current Hours-Of-Service regulations requirements.

Source: Unique trailer identifiers a motor carrier uses in their normal course of business and includes on dispatch documents, or the license number and licensing jurisdiction of each towed unit; trailer number(s)

must be updated each time hauled trailers change.

Data Type: Automatically captured by the ELD or populated by the motor carrier or entered by the driver; must be updated each time the hauled trailer(s) change.

Carrier Name

7.2 Carrier Name

Description: This refers to the motor carrier's legal name for conducting commercial business.

Purpose: Provides a recognizable identifier about the motor carrier on viewable ELD outputs.

Source: Motor carrier or driver.

Data Type: Programmed or entered by the motor carrier during account creation and updated by the driver or the motor carrier to reflect true and accurate information for the driver.

Home Terminal Address & Principal place of Business Address

7.48 Motor Carrier Address

Description: This refers to the motor carrier addresses. This is a placeholder for Home Terminal Address, which refers to the address of the home terminal location designated by the motor carrier, and Principal place of Business Address, which refers to address of the principal place of business designated by the motor carrier.

Purpose: Identifies the home terminal and principal place of business addresses (2 addresses, either identical or different) of the motor carrier. Makes ELD RODS consistent with the current Hours of Service regulation.

Source: Motor carrier or driver.

Data Type: Programmed or entered by the motor carrier during account creation and updated by the driver or the motor carrier to reflect true and accurate information for the driver.

Cycle Used

7.36 Cycle Used

Description: This refers to the cycle 1 (7 days) or cycle 2 (14 days) used to compute cumulative duty hours.

Purpose: Provides ability to apply the current Hours of Service regulations accordingly.

Source: Motor carrier or driver.

Data Type: Programmed or entered by the motor carrier during account creation and updated by the driver or the motor carrier to reflect true and accurate information for the driver.

7.1 Day Starting Time

Description: This refers to the day starting time designated by the motor carrier for driver's home terminal.

Purpose: Identifies the bookends of the workday for the driver; makes ELD RODS consistent with the current Hours of Service regulations.

Source: Motor carrier or driver.

Data Type: Programmed or entered by the motor carrier during account creation and updated by the driver or the motor carrier to reflect true and accurate information for the driver.

Designation for start time expressed in time standard in effect at the driver's home terminal.

7.41 Time Zone Offset from UTC

Description: This refers to the offset in time between UTC time and the time standard in effect at the driver's home terminal.

Purpose: Establishes the ability to link records stamped with local time to a universal reference.

Source: Calculated from measured variable UTC Time and Time Standard in Effect at driver's home terminal Time; Maintained together with "Day Starting Time" by the motor carrier or the driver or tracked automatically by ELD.

Data Type: Programmed or populated on the ELD during account creation and maintained by the motor carrier, the driver or the ELD to reflect true and accurate information for the driver. This parameter must adjust for Daylight Saving Time changes in effect at the driver's home terminal.

7.26 Exempt Driver Configuration

Description: A parameter indicating whether the motor carrier configured a driver profile to claim exemption from ELD use.

Purpose: Provides ability to code the motor carrier exemption for the driver electronically.

Source: Motor carrier's configuration for a given driver.

Data Type: ELD parameter programmed during account creation and maintained by the motor carrier in accordance with the qualification requirements and to reflect true and accurate information for the driver.

Exempt Driver Status (E: exempt 0: No)

3.1.3 Configuration of user account exempt from using an ELD

As specified in **4.3.3.1.2** of the Technical Standard, an ELD must allow a motor carrier to configure an ELD for a driver who may be exempt from the use of an ELD. An example of an exempt driver would be a driver driving under the short-haul exemption under the current Hours of Service regulations (i.e., specified as within a radius of 160 km of the home terminal). Even though exempt drivers do not have to use an ELD, an ELD equipped CMV may be shared between exempt and non-exempt drivers and motor carriers can use this allowed configuration to avoid issues with unidentified driver data diagnostics errors.

Raven's Rule: 7.26 indicates whether a motor carrier has set up a driver profile to claim an exemption from using an ELD. This allows the motor carrier to electronically code the exemption for the driver. It is a data type that is programmed during account creation and maintained by the motor carrier to ensure accurate information for the driver. The purpose of this configuration is to allow motor carriers to comply with the qualification requirements and accurately reflect the exempt status of drivers. This is particularly useful when an ELD equipped commercial motor vehicle is shared between exempt and non-exempt drivers, as it helps prevent errors related to unidentified driver data.

Date and Time

7.8 Date

Description: In combination with the variable "Time", this parameter stamps ELD records with a reference in time; even though date and time must be captured in UTC, event records must use date and time converted to the time zone in effect at the driver's home terminal as specified in **4.4.3**.

Purpose: Provides ability to record the instance of recorded events, entries, and edits.

Data Type: UTC date must be automatically captured by ELD; date in effect at the driver's home terminal must be calculated as specified in **4.4.3**.

4.3.1.5 Date and Time

a) The ELD must obtain and record the date and time information automatically without allowing any external input or interference from a motor carrier, driver, or any other person.

b) The ELD time must be synchronized to Coordinated Universal Time (UTC) and the absolute deviation from UTC must not exceed 10 minutes at any point in time.

4.4.3 Date and Time Conversions

a) An ELD must have the capability to convert and track date and time captured in UTC standard to the time standard in effect at driver's home terminal, taking the daylight savings time changes into account by using the parameter "Time Zone Offset from UTC" as specified in **7.41** of the Technical Standard.

b) An ELD must record the driver's RODS using the time standard in effect at the driver home terminal for a day beginning with the time designated by the motor carrier for that driver's home terminal.

c) The data element "Time Zone Offset from UTC" must be included in the "Driver's Certification of Own RODS" events as specified in **4.5.1.4** of the Technical Standard.

Raven's Rule: An ELD needs to be able to convert and track the date and time from Coordinated Universal Time (UTC) to the local time standard at the driver's home terminal. It should also consider daylight saving time changes. This is done by using the "Time Zone Offset from UTC" parameter as specified in section **7.41** of the Technical Standard. An ELD should record the driver RODS using the time standard that is in effect at the driver home terminal. This means that for each day, the ELD should start recording at the time specified by the motor carrier for the driver's home terminal. When a driver certifies their own RODS, the ELD should include the time zone offset from UTC in the recorded information.

Current Latitude and Current Longitude

7.31 Latitude

Description: An angular distance in degrees north and south of the equator.

Purpose: In combination with the variable "Longitude", this parameter stamps records requiring a position attribute with a reference point on the face of the earth.

7.33 Longitude

Description: An angular distance in degrees measured on a circle of reference with respect to the zero (or prime) meridian; The prime meridian runs through Greenwich, England (fun fact, I have been there in person and stood on both sides of the line.)

Purpose: In combination with the variable "Latitude", this parameter stamps records requiring a position attribute with a reference point on the face of the earth.

Current Total Vehicle Distance (start – end of day)

7.43 Vehicle Distance

Description: This refers to the distance traveled using the CMV in whole kilometers; this parameter is a placeholder for Total Vehicle Distance, which refers to the odometer reading and is used in recording Accumulated Vehicle Distance, which refers to the accumulated distance in the given ignition power on cycle and is used in the recording of all other events.

Purpose: Provides ability to track distance traveled while driving the CMV in each duty status. Total distance traveled within a day is a required field in the current Hours of Service regulations.

Source: ELD measurement or sensing.

Data Type: Acquired from the engine ECM or a comparable other source as allowed in **4.3.1.3** of the Technical Standard.

4.3.1.3 Vehicle Distance

a) An ELD must monitor vehicle distance as accumulated by a CMV over the course of an ignition power on cycle (accumulated vehicle distance) and over the course of a CMs activity (total vehicle distance).

Vehicle distance information must use or must be converted to units of whole kilometers.

b) If an ELD is required to have a link to the vehicle's engine ECM and vehicle distance information can be acquired from the engine ECM as specified in **4.2** of the Technical Standard:

(1) The ELD must monitor the engine ECMs odometer message broadcast and use it to record total vehicle distance information; and

(2) The ELD must use the odometer message to determine accumulated vehicle distance since the Engines last power on instance.

c) If the CMV does not have an engine ECM or the vehicle distance information cannot be acquired from the engine ECM as specified in **4.2** of the Technical Standard, the accumulated vehicle distance indication must be obtained or

estimated from a source that is accurate to within ±10% of distance accumulated by the CMV over a day as indicated on the vehicle's odometer display.

d) An ELD must monitor the cumulative distance driven for personal use throughout the day.

e) Accumulated vehicle distance must exclude the distance driven in respect of the driver's personal use of the vehicle.

f) The ELD must automatically record the Total Vehicle Distance value for the beginning and end of each day. As specified in **4.8.1.3** of the Technical Standard, such value must be reported as the End Odometer of the current day, and the Start Odometer of the next day.

Raven's Rule: This is the distance traveled by a CMV in kilometers from the start to the end of the day. This is important for recording the accumulated distance within a duty cycle and for complying with the current Hours of Service regulations. The data can be obtained from the ECM or another reliable source. If the vehicle does not have an engine ECM or the information cannot be acquired from it, the accumulated vehicle distance can be estimated from a source that is accurate within ±10% of the distance displayed on the vehicle's odometer. It is also necessary for the ELD to monitor and record the total vehicle distance for the beginning and end of each day.

Current Total Engine Hours

7.19 Engine Hours

Description: This refers to the time the CMV engine is powered in decimal hours with 0.1 hour (6-minute) resolution; this parameter is a placeholder for Total Engine Hours, which refers to the aggregated time of a vehicles engines activity since its inception, and used in recording engine power on and engine shut down events, and also for Elapsed Engine Hours, which refers to the elapsed time in the engines activity in the given ignition power on cycle, and used in the recording of all other events.

Purpose: Provides ability to identify gaps in the driving of a CMV, when the vehicles engine may be powered but the ELD may not; provides ability to cross

check integrity of recorded data elements in events and prevent gaps in the recording of ELD.

Source: ELD measurement or sensing.

Data Type: Acquired from the engine ECM or a comparable other source as allowed in **4.3.1.4** of the Technical Standard.

4.3.1.4 Engine Hours

a) An ELD must monitor engine hours of the CMV over the course of an ignition power on cycle (elapsed engine hours) and over the course of the total engine hours of the CMV's activity (total engine hours).

Engine hours must use or must be converted to hours in intervals of a tenth of an hour.

b) If an ELD is required to have a link to the vehicle's engine ECM and engine hours information can be

acquired from the engine ECM as specified in **4.2** of the Technical Standard, the ELD must monitor the engine ECM's total engine hours message broadcast and use it to record elapsed and total engine hours

information.

c) If the CMV does not have an engine ECM or the engine hours information cannot be acquired from the engine ECM as specified in **4.2** of the Technical Standard, engine hours must be obtained or estimated from a source that monitors the ignition power of the CMV and must be accurate within ±0.1 hour of the engine's total activity within a given ignition power on cycle.

Raven's Rule: This is the total amount of time the engine of a commercial motor vehicle CMV has been powered. It is measured in decimal hours with a resolution of 0.1 hour (equivalent to 6 minutes). This is used to record engine power on and engine shut down events and to track the elapsed time of engine activity within a given ignition power on cycle. The purpose of tracking the Current Total Engine Hours is to identify any gaps in the driving of a CMV, where the vehicle's engine may be powered but the ELD may not be recording. It also helps to ensure the accuracy and integrity of recorded data elements in events and prevents any gaps in the ELD recording.

The source of the data is the ELD itself, which measures or senses the engine activity. It can acquire this information from the engine ECM or a compatible source as specified in the Technical Standard.

If the ELD is linked to the vehicle ECM and can acquire engine hours information from it, it must monitor the ECM's total engine hours and use it to record both elapsed and total engine hours information. If the CMV does not have an engine ECM or the engine hours information cannot be acquired from the ECM, the ELD must obtain or estimate the engine hours from a source that monitors the ignition power of the vehicle. The estimated engine hours must be accurate within ±0.1 hour of the engine's total activity within a given ignition power on cycle.

ELD Certification ID

7.17 ELD Certification ID

Description: An alphanumeric identifier assigned to the ELD that was certified during the ELD certification process.

Purpose: Provides ability to cross-check that the ELD model and software version were certified.

Source: Received from the certification entity during the ELD certification process.

ELD Identifier

7.15 ELD Identifier

Description: An alphanumeric identifier assigned by the ELD provider to the ELD model and software version that was certified.

Purpose: Provides ability to cross-check that the ELD used in the recording of a driver's RODS is certified through the ELD certification process.

ELD Authentication Value

7.14 ELD Authentication Value

Description: An alphanumeric value that is unique to an ELD and verifies the authenticity of the given ELD.

Purpose: Provides ability to cross-check the authenticity of an ELD used in the recording of a driver's RODS during inspections.

Source: ELD provider-assigned value; includes a certificate component and a hashed component; necessary information related to authentication keys and hash procedures disclosed by the ELD provider during the ELD certification process.

7.38 Output File Comment

Description: A textual field that may be populated with information pertaining to the created ELD output file; An authorized safety official may provide a key phrase or code to be included in the output file

comment, which may be used to link the requested data to an inspection, inquiry, or other enforcement action; if provided to the driver by an authorized safety official, it must be entered into the ELD and included in the exchanged dataset as specified.

Purpose: The output file comment field provides an ability to link submitted data to an inspection, inquiry, or other enforcement action, if deemed necessary; further, it may also link a dataset to a vehicle, driver, carrier, and/or ELD that may participate in voluntary future programs that may involve exchange of ELD data.

GRID

4.8.1.1 Printout Requirements

Printout must be able to accommodate the graph grid specifications as listed in **4.8.1.3** of the Technical Standard.

Hours of Service **77 (2)** The motor carrier shall require the driver to record, and the driver shall record for each day, in accordance with these Regulations and the

Technical Standard, all the information associated with their record of duty status as their duty status changes.

SCHEDULE 2

(Subsections 82(1) and (2) Duty Status Grid



4.8.1.3 Information to be Shown on the Day Graph Grid

- Total hours.
- Off duty.
- Sleeper Berth.
- Driving; and
- On duty not driving.

c) The printout and display must show a graph-grid consistent with the current Hours of Service regulations showing each change of duty status.

(1) On the printout, the graph-grid for each day's RODS must be at least 15 centimeters by 4 centimeters in size.

(2) On the printout, the Geo-location information for each duty status change can be omitted on the graph-grid.

SCHEDULE XVIII

(Sections 1 to 4)

Motor Vehicle Transport Act

Commercial Vehicle Driver'ss Hours of Service Regulations

82(1) (a) Failure to enter information in record of duty status at beginning of each day is \$500.00

(b) Failure to require driver to enter information in record of duty status at beginning of each day is \$1000.00

82(2) (a) Failure to record information as required in record of duty status \$500.00

REQUIRED DATA FOR ELD EVENTS

Accurate and detailed event sequence data is crucial for maintaining ELD compliance. This section focuses on the required data elements related to event sequence identification numbers, event record status, origin, type, code, date, time, accumulated vehicle distance, engine hours, latitude, longitude, distance since last valid coordinates, malfunction indicator status, data diagnostic event indicator status, comment/annotation, driver location description, and event data check value.

This section explores the significance and detailed specifications for each required data element, providing a comprehensive understanding of their role in capturing, organizing, and analyzing event sequence data in ELDs.

Event Sequence ID Number - 7.24

Event Record Status - 7.23 and Table 8

Event Record Origin - 7.22 and Table 7

Event Type - 7.25 – Table 9 and Event Code - 7.20 – Table 6

Date – 7.8

Time - 7.40

Accumulated Vehicle Distance - 7.43

Engine Hours - 7.19

Latitude - 7.31

Longitude – 7.33

Distance Since Last Valid Coordinates - 7.9

Malfunction Indicator Status for ELD - 7.35

Data Diagnostic Event Indicator Status for Driver - 7.7

Comment /Annotation - 7.6

Driver Location Description - 7.12 and 4.3.2.7. c)

Event Data Check Value - 7.21

Event Sequence ID Number - 7.24

Event Sequence ID Number **7.24** - This is serial identifier assigned to each required ELD event as described in **4.5.1** of the Technical Standard. It keeps a continuous record, on a given ELD, across all users of that ELD. The sequence ID is the most important concept to understand when reviewing an ELD. Every event has an ID, and those ID are in a continuous record. If an inspector needs to find an event use the CTRL f and enter the ID. The events immediately before or after may help explain the event.

Event Record Status - 7.23 and Table 8

Event Record Status **7.23** this value indicates if an event is active or inactive. If an event is inactive, is it inactive because of a change or lack of confirmation by the driver or due to a rejection of change request and keeps track of edits and entries performed while retaining original records.

Table 8

Event Record Status	Status Code
Active	1
Inactive	Changed 2
Inactive	Change Requested 3
Inactive	Change Rejected 4

Event Record Origin - 7.22 and Table 7

Event Record Origin **7.22** this indicates if an event was automatically recorded, or edited, entered or accepted by the driver or requested by another authenticated user, or assumed from unidentified driver profile. Most events are required to be automatically recorded by the ELD; this number tracks the origin of the records.



Table 7

Event Record Origin	Event Record Origin
Automatically recorded by ELD	1
Edited or entered by the Driver	2
Edit requested by an Authenticated User other than the	Driver 3
Assumed from Unidentified Driver profile	4

Raven's Rule: A code of 2, 3 or 4 should be noted for additional inspection.

Event Type - 7.25 – Table 9 and Event Code - 7.20 – Table 6 of the Technical Standard. These events are dependent on each other.

Event Type 7.25 this is the type of event as per Table 9

Table 9

Event Type	Code
A change in driver's dut <mark>y stat</mark> us	1
An intermediate log	2
A change in driver's indication of personal use of CMV or yard moves	3
A driver's certification/re-certification of RODS	4
A driver's login/logout activity	5
CMV's engine power up/shut down activity	6
A malfunction or data diagnostic detection occurrence	7
Off-duty time deferral	20
A change in driver's cycle	21
A change in operating zone	22
Additional hours not recorded	23

Event Code - 7.20

Event Code **7.20** relies on the event type to provide additional information. Event code specifies the nature of the change indicated in the Event Type. For example, Event Type parameter is status change, and the dependent attribute is new status. The new status would indicate what the status is after the change had occurred. The dependent attribute is supporting information that provides more details about the change indicated by the Event Type as per **Table 6**.

Table 6 Event Type

Event Type Event Code Description

1	1	Driver duty status changed to "Off-Duty"
1	2	Driver duty status changed to "Sleeper Berth"
1	3	Driver duty status changed to "Driving"
1	4	Driver duty status changed to "On-duty not driving"
2	1	Intermediate log with conventional location precision
2	2	Intermediate log with reduced location precision
3	1	Driver indicates "Authorized Personal Use of CMV"
3	2	Driver indicates "Yard Moves"
3	0	Driver indication for PC and YM cleared
4	1	Driver first certification of a RODS
4	n	Driver n th certification of a RODS (when recertification necessary).

"n" is an integer between 1 and 9. If more than 9 certifications needed, use 9 for each new re-certification record.

5 1 Authenticated driver ELD login activity

5	2	Authenticated driver ELD logout activity
6	1	Engine power-up with conventional location precision
6	2	Engine power-up with reduced location precision
6	3	Engine shut down with conventional location precision
6	4	Engine shut down with reduced location precision
7	1	An ELD malfunction logged
7	2	An ELD malfunction cleared
7	3	A data diagnostic event logged
7	4	A data diagnostic event cleared
20	0	Off-duty time deferral set to "none"
20	1	Off-duty time deferral set to "Day 1"
20	2	Off-duty time deferral set to "Day 2"
21	1	Cycle set to "Cycle 1"
21	2	Cycle set to "Cycle 2"
22	1	Operating zone set to "south of latitude 60°N in Canada"
22	2	Operating zone set to "north of latitude 60°N in Canada"
22	3	Operating zone set to "United States"
23	1	Additional hours not recorded

Date – 7.8

7.8 Date is always with time and provides the event with a reference point. The date and time are converted to the time zone in effect at the driver home terminal. It is displayed as MMDDYY - month day year.

Time - 7.40

7.40 Time is always with date and provides the event with a reference point. The date and time are converted to the time zone in effect at the driver home terminal. It is displayed as HHMMSS – hour, minute, second.

Accumulated Vehicle Distance - 7.43

7.43 Vehicle Distance is the distance traveled in whole kilometers and is a placeholder for total vehicle distance. The odometer reading is used to generate accumulated vehicle distance. This is the accumulated distance in an ignition power on cycle. The accumulated vehicle distance will increase as the vehicle is moving and this distance is used to calculate total distance for the day.

Engine Hours - 7.19

7.19 Engine Hours is the time a CMV engine is powered on and is a place holder for total engine hours. The accumulated engine hours will increase as the engine is running and that accumulated time is the total engine hours for the day. Engine hours are used to identify gaps when the engine is powered and the ELD is not collecting data. A ELD must begin collecting data within 1 minute of the engine powering on and must remain on and collecting data the entire time the engine is powered. Gaps in engine hours require further review.

Latitude - 7.31

7.31 Latitude is a distance in degrees north and south of the equator. This stamps the records requiring a position. Latitude is always with Longitude.

Longitude – 7.33

7.33 Longitude is a distance in degrees measured on a circle of reference with respect to the zero (or prime) meridian; The prime meridian runs through Greenwich, England (I've been there and stood on both sides). Longitude is always with latitude.

Distance Since Last Valid Coordinates - 7.9

7.9 Distance Since Last Valid Coordinates are the kilometers traveled since the last latitude and longitude were collected within the required accuracy. This measurement provides ability to keep track of location for recorded events in cases of temporary position measurement outage. If the distance traveled since the last valid coordinate measurement exceeds 9 kilometers, the ELD will enter the value as 9. if there is a continuous period of 0 in the "Distance Since Last Valid Coordinates," it suggests that the device is measuring correctly during that time period. This means that the device is successfully capturing and recording accurate location data without any interruptions or gaps in the measurements.

Malfunction Indicator Status for ELD - 7.35

7.35 Malfunction Indicator Status identifies if the ELD unit has an active malfunction at the time of event recording. 0 is no active malfunction and 1 is at least one active malfunction. A malfunction in the ELD effects all drivers that log into that device.

Data Diagnostic Event Indicator Status for Driver - 7.7

7.7 Data Diagnostic Event Indicator Status identifies if the ELD unit has an active data diagnostic event for the authenticated driver at the time of event recording. 0 is no active data diagnostic events for the driver and 1 is at least one active data diagnostic event set for the driver. A data diagnostic event is for the specific driver that was logged into that ELD when the record was generated.

Comment /Annotation - 7.6

7.6 Comment/Annotation is a text note related to a record, update, or edit with the comments of driver or authorized support personnel. Some events require a comment.

Driver Location Description - 7.12

7.12 Driver Location Description is a text note of the location of the CMV, inputted by the driver when prompted by the ELD as specified in **4.3.2.7**. This allows for the driver to enter a location related to missing records when there are
temporary positioning service interruptions or outage without recording a position malfunction.

4.3.2.7. c) A manual location entry must show M in the latitude/longitude coordinates fields in ELD RODS. Use the CTRL F function to find manual locations that require secondary review.

Event Data Check Value - 7.21

7.21 Event Data Check Value is an internal function of the ELD that provides ability to identify cases where an ELD event record may have been inappropriately modified after its original recording as in **4.4.5.1** of the Technical Standard.

EVENT DETAILS

Hours of Service 77(2) requires drivers to record their duty status and associated information using an ELD. These records include events triggered by changes in duty status, which are collected from the ECM. An ELD event refers to a specific instance when the ELD records data related to the driver's duty status and the operational integrity of the ELD system. These events can be triggered by the driver or the ELD itself, and the Technical Standard specifies the required data elements for each event. This chapter provides an overview of the rules and guidelines for recording ELD events accurately.

3.1.2 ELD Event

- 4.5.1 Events and Data to Record
- 4.7.4 ELD Events Recorded in a Software Application
- 4.2 ELD-Vehicle Interface
- 4.3.1 ELD Sensing
- 4.3.1.1 Engine Power Status
- 4.3.1.2 Vehicle Motion Status
- 4.3.1.3 Vehicle Distance
- 4.3.1.4 Engine Hours

4.3.1.5 Date and Time

4.3.1.6 CMV Position

4.3.1.7 CMV VIN

EVENT DETAILS:

Changes in driver's Duty Status, Intermediate Logs and Special Driving Conditions (Personal Use and Yard Moves)												
Date & time	Event	Geo-Location	Latitude, L	ongitude	Distance last val. coord.	CMV	Distance (Accum.)	Hours (Elapsed)	Distance (Total)	Record Status	Record Origin	Seq. ID
11-19-18												
00:20:12	ON	8 km SSW Montreal QC	36.99	-121.55	0	12345	0	0.0		1	1	1110
00:21:45	YM start	8 km SSW Montreal QC	36.99	-121.55	0	12345	0	0.0	346470	1	1	1111
00:52:52	YM end	8 km SSW Montreal QC	36.99	-121.55	0	12345	1	0.5	346471	1	1	1112
00:53:31	DR	8 km SSW Montreal QC	36.99	-121.55	0	12345	1	0.5		1	1	1113
01:53:31	INT	Geo-Location	40.70	-85.46	0	12345	99	1.5		1	1	0FBB
02:53:31	INT	Geo-Location	41.54	-85.06	0	12345	202	2.5		1	1	0FBC
03:15:28	SB	Rest Area, Mallorytown, HW 401	М	М	9	12345	233	2.9		1	1	0FBD
16:48:29	ON	Geo-Location	45.21	-74.34	0	12345	0	0.0		1	1	0FE2
17:19:15	DR	Geo-Location	45.21	-74.34	0	12345	0	0.2		1	1	0FE6

77 (2) The motor carrier shall require the driver to record, and the driver shall record for each day, in accordance with the current Hours of Service Regulations and the Technical Standard, all the information associated with their record of duty status as their duty status changes. Events are the information collected from the ECM via the ELD when a driver has a change of duty status.

3.1.2 ELD Event

An ELD event refers to a distinct instance in time when the ELD records data with the data elements specified in the Technical Standard. The distinct ELD events relate to the driver duty status and the ELD operational integrity. They are either triggered by input from the driver (e.g., driver duty status changes, driver login/logout activity, etc.) or triggered by the ELDs internal monitoring functions (e.g., ELD malfunction detection, data diagnostics detection, intermediate logs, etc.). ELD events and required data for each type of ELD event are described in detail in **4.5.1** of the Technical Standard.

4.5.1 the Technical Standard

4.5.1 Events and Data to Record

a) An ELD must record data for all distinct events specified in s **4.5.1.1 – 4.5.1.11** of the Technical Standard.

b) If the driver is using a software application specified in **4.7.4** of the Technical Standard or the ELD is implemented on a handheld unit that did not establish a link to the engine ECM as described in **4.2** of the Technical Standard, data elements from the vehicle engine ECM and the CMV Power Unit Number may be omitted in the records for the following event types and conditions:

(1) A driver login/logout activity.

(2) A change in driver duty status, only if the event is triggered by the driver and is not automatically recorded by the ELD, as specified in s **4.4.1.1 and 4.4.1.2** of the Technical Standard.

(3) Driver certification/re-certification of RODS.

- (4) Off-Duty Time Deferral.
- (5) Change in Driver Cycle; and
- (6) Additional Hours Not Recorded.

Raven's Rule: An ELD (Electronic Logging Device) is required to record data for specific events outlined in s **4.5.1.1 to 4.5.1.11** of the Technical Standard.

However, in certain situations, data may be omitted from the records if the driver is using a specific software application or if the ELD is implemented on a handheld unit that did not establish a connection to the engine ECM. These events are: driver login/logout, changes in driver duty status triggered by the driver, driver certification/re-certification of RODS, off-duty time deferral, change in driver cycle, and additional hours not recorded. In these cases, the CMV Power Unit Number may not be included in the records.

ELD using a software application (driver using a APP on a phone or tablet)

4.7.4 of the Technical Standard:

4.7.4 ELD Events Recorded in a Software Application

a) An ELD may provide a means for a driver to record ELD events in a software application that is not integrally synchronized with the engine of the CMV, as specified in **4.2** of the Technical Standard.

Furthermore, such application may not include any sensing functionality described in **4.3.1** of the Technical Standard, but it is compliant with the date and time requirements specified in **4.3.1.5** of the Technical Standard.

b) If this function is implemented by the ELD, the software application specified in **4.7.4 (a)** of the Technical Standard must also meet the requirements of this.

c) When using this function, the ELD must allow the driver to select only the following event types, as described in **7.25** of the Technical Standard:

- (1) Change in driver duty status (only on-duty or off-duty).
- (2) Driver certification/re-certification of RODS.
- (3) Driver login/logout activity.
- (4) Off-duty time deferral.
- (5) Driver cycle change; and
- (6) Additional hours not recorded.

Raven's Rule: 4.7.4 of the Technical Standard relates to the recording of ELD events using a software application. Here are the key points:

- An ELD can allow the driver to record ELD events in a software application that is not directly synchronized with the vehicle's engine, as specified in
 4.2. This means that the software application does not have direct access to engine data.
- If the ELD provides this functionality, the software application must also meet the requirements specified in **4.7.4**.

- When using this function, the ELD must allow the driver to select only specific types of events. These are: changes in driver duty status, driver certification/re-certification of RODS, driver login/logout activity, deferral of off-duty time, driver cycle change, and recording of additional hours not originally recorded. These event types are defined in **7.25**.
- The ELD must only allow one event type to be selected at any given time and use the latest selection by the driver.
- When using this function and for each event type listed in 4.7.4 (c) of the Technical Standard, the ELD must record the same data elements outlined in 4.5.1 of the Technical Standard. However, a subset of the required data elements must be omitted in the records, as described in further detail below. When a driver selects any of those events, the ELD must: Record the character X in both the latitude and longitude fields, unless location description is entered manually by the driver, in which case it must record the character M instead. If the ELD event is due to a change in duty status for the driver, the ELD must prompt the driver to enter the location description in accordance with 4.3.2.7 of the Technical Standard. If the driver does not enter the location description, ELD must record a missing required data element data diagnostic event for the driver. *** when reviewing RODS a X or M needs additional review. ***
- When the ELD meets the requirements specified in **4.5.1 (b)** of the Technical Standard, the following data may be left blank in the event records if they are not available or cannot accurately be determined:
 - (1) Vehicle Distance as described in **7.43**.
 - (2) Engine Hours as described in 7.19.
 - (3) CMV VIN as described in 7.5; and

(4) CMV Power Unit Number associated with the record as described in **7.4**.

• For each event recorded when a subset of the required data elements is omitted in the RODS, the ELD must prompt the driver to acknowledge and confirm that required data elements were omitted in the event record.

• For all data elements specified in **4.5.1 (c)** of the Technical Standard that are omitted in the event records, the ELD must not permit alteration of the original information recorded, as specified in **4.3.2.8** of the Technical Standard.

4.2 ELD-Vehicle Interface

a) An ELD must be integrally synchronized with the engine of the CMV. Engine synchronization for purposes of ELD compliance means the monitoring of the vehicle's engine activity to automatically record the engine's power status, vehicle's motion status, total distance driven value, and engine hours value when the CMV's engine is powered.

b) If the CMV's engine has an Electronic Control Module (ECM), the ELD must establish a link to the ECM when the CMV's engine is powered on and must automatically receive the engine's power status, vehicle's motion status, total distance driven value and engine hours value through the serial or CAN communication protocols supported by the vehicle's ECM. If the CMV does not have an ECM or any required data element cannot be captured from the ECM, an ELD must use alternative sources to obtain or estimate these vehicle parameters with the listed accuracy requirements under **4.3.1** of the Technical Standard.

Raven's Rule: The **4.2** ELD-Vehicle Interface are the requirements for how an ELD must connect and communicate with the engine of CMV.

a) For ELD compliance, the ELD must be able to synchronize with the CMV engine. The ELD must automatically record; power, motion, distance, and engine hours whenever the engine is powered.

b) If the CMV's engine has an Electronic Control Module (ECM), the ELD needs to establish a connection (or link) to this ECM when the engine is powered on. It needs to be able to receive power, motion, distance, and engine hours. This communication should happen through serial or CAN communication protocols that are supported by the vehicle's ECM.

However, if the CMV doesn't have an ECM or if any required data cannot be captured from the ECM, the ELD needs to use alternative sources to obtain or estimate these vehicle parameters.

4.3.1 of the Technical Standard.

4.3.1 ELD Sensing: These are the items the ELD is consistently monitoring.

4.3.1.1 Engine Power Status

An ELD must be powered on and become fully functional within 1 minute of the vehicle's engine receiving power and must remain powered for as long as the vehicle's engine stays powered.

4.3.1.2 Vehicle Motion Status

a) An ELD must automatically determine whether a CMV is in motion or stopped by comparing the vehicle speed information with respect to a set speed threshold as follows:

(1) Once the vehicle speed exceeds the set speed threshold, it must be considered in motion.

(2) Once in motion, the vehicle must be considered in motion until its speed falls to 0 km/h and stays at 0 km/h for 3 consecutive seconds. Then, the vehicle will be considered stopped.

(3) An ELD's set speed threshold for determination of the in-motion state for the purpose of this must not be configurable to greater than 8 km/h.

b) If an ELD is required to have a link to the vehicle ECM and vehicle speed information can be acquired from the ECM as specified in

4.2 of the Technical Standard, vehicle speed information must be acquired from the ECM.

c) If the CMV does not have an ECM or the vehicle speed information cannot be acquired from the ECM as specified in **4.2** of the Technical Standard, vehicle speed information must be acquired using an independent source apart from the positioning services described under **4.3.1.6** of the Technical Standard and must be accurate within ±5 km/h of the CMV's true ground speed for purposes of determining the in-motion state for the CMV.

4.3.1.3 Vehicle Distance

a) An ELD must monitor vehicle distance as accumulated by a CMV over the course of an ignition power on cycle (accumulated vehicle distance) and over the course of a CMV's activity (total vehicle distance).

Vehicle distance information must use or must be converted to units of whole kilometers.

b) If an ELD is required to have a link to the vehicle ECM and vehicle distance information can be acquired from the ECM as specified in **4.2** of the Technical Standard:

(1) The ELD must monitor the ECM's odometer message broadcast and use it to record total vehicle distance information; and

(2) The ELD must use the odometer message to determine accumulated vehicle distance since the engine's last power on instance.

c) If the CMV does not have an ECM or the vehicle distance information cannot be acquired from the ECM as specified in **4.2** of the Technical Standard, the accumulated vehicle distance indication must be obtained or estimated from a source that is accurate to within ±10% of distance accumulated by the CMV over a day as indicated on the vehicle's odometer display.

d) An ELD must monitor the cumulative distance driven for personal use throughout the day.

e) Accumulated vehicle distance must exclude the distance driven in respect of the driver's personal use of the vehicle.

f) The ELD must automatically record the Total Vehicle Distance value for the beginning and end of each day. As specified in **4.8.1.3** of the Technical Standard, such value must be reported as the "End Odometer" of the current day, and the "Start Odometer" of the next day.

4.3.1.4 Engine Hours

a) An ELD must monitor engine hours of the CMV over the course of an ignition power on cycle (elapsed engine hours) and over the course of the total engine hours of the CMV's activity (total engine hours). Engine hours must use or must be converted to hours in intervals of a tenth of an hour.

b) If an ELD is required to have a link to the vehicle's ECM and engine hours information can be acquired from the ECM as specified in **4.2** of the Technical Standard, the ELD must monitor the ECM's total engine hours message broadcast and use it to record elapsed and total engine hours information.

c) If the CMV does not have an ECM or the engine hours information cannot be acquired from the ECM as specified in **4.2** of the Technical Standard, engine hours must be obtained or estimated from a source that monitors the ignition power of the CMV and must be accurate within ±0.1 hour of the engine's total activity within a given ignition power on cycle.

4.3.1.5 Date and Time

a) The ELD must obtain and record the date and time information automatically without allowing any external input or interference from a motor carrier, driver, or any other person.

b) The ELD time must be synchronized to Coordinated Universal Time (UTC) and the absolute deviation from UTC must not exceed 10 minutes at any point in time.

4.3.1.6 CMV Position

a) An ELD must automatically determine the position of the CMV in standard latitude/longitude coordinates with the accuracy and availability requirements.

b) The ELD must obtain and record this information without allowing any external input or interference from a motor carrier, driver, or any other person.

c) CMV position measurement must be accurate to ±0.8 kilometer of absolute position of the CMV when an ELD measures a valid latitude/longitude coordinate value.

d) Position information must be obtained in or converted to standard signed latitude and longitude values and must be expressed as decimal degrees to hundreds of a degree precision (i.e., a decimal point and two decimal places).

e) Measurement accuracy combined with the reporting precision requirement implies that position reporting accuracy will be on the order of ±1.6 kilometer of absolute position of the CMV during the course of a CMV's commercial operation.

f) An ELD must be able to acquire a valid position measurement at least once every 8 kilometers of driving; however, the ELD records CMV location information only during ELD events as specified in **4.5.1** of the Technical Standard.

4.3.1.7 CMV VIN

The vehicle identification number (VIN) for the power unit of a CMV must be automatically obtained from the ECM and recorded if it is available on the vehicle database.

Raven's Rule: 4.3.1 ELD Sensing are the things that the ELD continuously monitors.

- **4.3.1.1** Engine Power Status: The ELD must be turned on and fully functional within 1 minute of the vehicle's engine being powered on, and it must remain on as long as the engine is running.

- **4.3.1.2** Vehicle Motion Status: The ELD must automatically determine if the CMV is in motion or stopped by comparing the vehicle's speed to a set threshold. Once the vehicle speed exceeds 8 km/h, it is considered in motion. Once the speed falls to 0 km/h and stays there for 3 seconds, the vehicle is considered stopped. If the ELD is connected to the engine's ECM, it will use the engine speed information. If not, it will use an independent source to get accurate vehicle speed information within ±5 km/h.

- **4.3.1.3** Vehicle Distance: The ELD monitors the distance traveled by the CMV. It records accumulated vehicle distance for each ignition cycle and total vehicle distance for the CMV's activity. If the ELD is connected to the engine's ECM, it uses the engine's odometer to monitor the distance. If not, it uses a source that is accurate within ±10% of the distance shown on the vehicle's odometer display. The ELD also records the total distance driven for personal use throughout the day.

- **4.3.1.4** Engine Hours: The ELD monitors the engine hours of the CMV during each ignition cycle and the total engine hours for the CMV's activity. If the ELD is connected to the engine's ECM, it uses the ECM's total engine hours to record the information. If not, it uses a source that monitors the ignition power of the CMV and is accurate within ±0.1 hour.

- **4.3.1.5** Date and Time: The ELD automatically obtains and records the date and time information. It cannot be changed by anyone. The time must be synchronized to Coordinated Universal Time (UTC) and the difference from UTC cannot exceed 10 minutes.

- **4.3.1.6** CMV Position: The ELD automatically determines the position of the CMV using latitude and longitude coordinates. It must not have any external input or interference. The position must be accurate within ±0.8 kilometer. The ELD must be able to acquire a valid position at least once every 8 kilometers of driving, but it only records the position during specific ELD events.

- **4.3.1.7** CMV VIN: If available on the vehicle data bus, the ELD will automatically obtain and record the Vehicle Identification Number (VIN) from the engine ECM.

SCHEDULE XVIII

(Sections 1 to 4)

Motor Vehicle Transport Act

Commercial Vehicle Drivers Hours of Service Regulations

77(2) (a) Failure to record information associated with record of duty status as required \$500.00

(b) Failure to require driver to record information associated with record of duty status as required is \$1000.00

77(5) Failure to manually input or verify required information in ELD is \$500.00

77(6) (a) Use more than one ELD at same time \$1000.00

(b) Request, require or allow driver to use more than one ELD at same time is \$2000.00

77(8) (a) Failure to record information related to record of duty status in complete and accurate manner is \$500.00

(b) Failure to ensure that driver records information related to record of duty status in complete and accurate manner \$1000.00

RAVEN'S RULES – UNIDENTIFIED DRIVING

Unidentified driving time will lead to inaccurate tracking of driver hours on the road and potential violations of the hours of regulations. When driving time goes unidentified, it becomes challenging to assign it to specific drivers or accurately monitor their compliance with rest periods. This lack of accountability can result in drivers driving longer hours than allowed, leading to increased fatigue and a higher risk of accidents. Additionally, unidentified driving time makes it difficult for companies to effectively manage their fleet and ensure the safety and wellbeing of their drivers. Addressing unidentified driving time is crucial for maintaining road safety and regulatory compliance.

- 4.4 ELD Processing and Calculations
- 4.4.1 Conditions for Automatic Setting of Duty Status
- 4.4.1.1 Automatic Setting of Duty Status to Driving
- 3.1.6 Unidentified Driver
- 4.1.2 Account creation
- 4.1.5 Non-Authenticated Driving of a CMV
- 4.4.4.2.4 Driver's Assumption of Unidentified Driver Logs
- 4.6.1.6 Monitoring Records Recorded under the Unidentified Driver Profile

Data Diagnostic Status	Unidentified Driving Records	Malfunction Status	
(Status & Diagnostic Code)	(0: none, 1: active)	(Status & Malfunction Code)	
1 (Code 2)	1	0	

The ELD mandate is intended to create a safer work environment for drivers, and make it easier and faster to accurately track, manage, and share RODS data. One of the main purposes of a ELD is to ensure drivers are logging all time and the ELD is how that time is logged, by using information from the ECM in the CMV.

Hours of Service **78.1** A motor carrier shall create and maintain a system of accounts for ELDs that is in compliance with the Technical Standard and that:

(b) provides for a distinct account for the driving time of an unidentified driver.

Hours of Service **99 (1)** A motor carrier shall, during business hours, at the request of an inspector, produce the following documents for inspection at the place specified by the inspector:

(b) records of driving time of an unidentified driver.

When a CMV has a ELD and the CMV travels at a speed greater than 32 km/h the ELD will automatically put the driver that is logged-in, into driving status. A driver must inform the ELD of that exemption before the CMV begins moving.

4.4 ELD Processing and Calculations

4.4.1 Conditions for Automatic Setting of Duty Status

4.4.1.1 Automatic Setting of Duty Status to Driving

An ELD must automatically record driving time when the vehicle is in motion by setting duty status to driving for the driver unless, before the vehicle is in motion, the driver:

a) Sets the duty status to off-duty and indicates personal use of CMV, in which case duty status must remain off-duty until any of the following conditions are met:

(1) A driver's indication of the driving condition ends.

(2) The ELD has reset to "none" after the ELD or CMV's engine went through a power off cycle (ELD or CMV's engine turns off and then on), as specified in4.3.2.2.2 (e) of the Technical Standard; or

(3) The cumulative distance driven for personal use throughout the day exceeds the maximum distance allowed under the personal use provision of the current Hour of Service regulations.

b) Sets the duty status to on-duty not driving and indicates yard moves, in which case duty status must remain on-duty not driving until any of the following conditions are met:

(1) A driver's indication of the driving condition ends.

(2) The ELD has reset to "none" after the ELD or CMV's engine went through a power off cycle (ELD or CMV's engine turns off and then on), as specified in
4.3.2.2.2 (e) of the Technical Standard; or

(3) The CMV exceeds a speed of 32 km/h.

Scenario A: Driver arrives at work to begin a shift and starts a CMV. The ELD device begins receiving power within 1 minute. When the ELD is powered and there is a wired connection the ECM and ELD will begin communicating. With a Bluetooth connection, the driver may have another step to ensure the ELD is connected to the ECM. The driver would log in and would go into on duty status. The ELD will start automatically recording driving when the vehicle reaches a speed of 32 km/h. The driver and the ELD would continue on happily in sync with the CMV.

Scenario B: Driver arrives at work to begin a shift and starts a CMV. The ELD device begins receiving power within 1 minute. When the ELD is powered and there is a wired or Bluetooth connection, the ECM and ELD will begin communicating. The ELD will start automatically recording driving when the vehicle reaches a speed of 32 km/h. If no driver is logged in or there is no Bluetooth connection the ELD provides the driver with an audible and visual warning, **4.6.1.6 a**) in the Technical Standard and **4.1.5** in the Technical Standard. The driver will turn the volume down and put the device face down as to not be annoyed by the flashing and beeping. All the time and distance are accumulated and held in the unidentified driver profile until the time is correctly assigned.

Scenario C: Driver arrives at work to begin a shift and starts a CMV. The ELD device begins receiving power within 1 minute. When the ELD is powered and there is a wired or Bluetooth connection, the ECM and ELD will begin communicating. When the driver logs-in, the ELD will inform the driver there is driving time and ask does it belong to the driver that just logged-in? Technical Standard **4.6.1.6** Monitoring Records Recorded under the Unidentified Driver Profile b). If the driver indicates no, the data returns to the ELD to wait for the next driver and the ELD keeps asking. If more than 30 minutes is accumulated in a 24-hour period, the ELD records an unidentified driving record and assigns that unidentified time to all drivers who logged into that ELD for the last 14 days.

3.1.6 Unidentified Driver

"Unidentified Driver" refers to the driving of a CMV featuring an ELD without an authenticated driver in the ELD. Functional specifications in the Technical Standard require an ELD to automatically record driving time under such conditions and attribute such records to the unique "Unidentified Driver account," as specified in **4.1.5** of the Technical Standard, until the motor carrier and the driver review the records and they are assigned to the true and correct owner.

4.1.2 Account creation

f) An ELD must reserve a unique driver account for recording events during nonauthenticated driving of a CMV. This Standard will refer to this account as the "unidentified driver account."

4.1.5 Non-Authenticated Driving of a CMV

a) An ELD must associate all non-authenticated driving of a CMV with a single ELD account labeled unidentified driver.

b) If a driver has not authenticated into the ELD, as soon as the vehicle is in motion, the ELD must:

(1) Provide a visual or visual and audible warning reminding the driver to stop and authenticate into the ELD.

(2) Record accumulated time for driving and on-duty not-driving statuses under the unidentified driver profile, in accordance with the ELD defaults described in 4.4.1 of the Technical Standard.

and

(3) Not allow entry of any information into the ELD other than a response to the driver authentication prompt.

4.4.4.2.4 Driver's Assumption of Unidentified Driver Logs

When a driver reviews and assumes ELD record(s) recorded under the unidentified driver profile, the ELD must:

a) Identify the ELD record(s) recorded under the unidentified driver profile that will be reassigned to the driver.

b) Use elements of the unidentified driver record(s) from **4.4.4.2.4(a)** of the Technical Standard and acquire driver input to populate missing elements of the record originally recorded under the unidentified driver profile and construct the new event record(s) for the driver.

c) Set the "event record status" of the ELD record(s) identified in **4.4.4.2.4(a)** of the Technical Standard, which is being modified, to "2" (inactive changed).

d) Set the "event record status" of the ELD record(s) constructed in **4.4.4.2.4(b)** of the Technical Standard to "1" (active); and

e) Set the "event record origin" of the ELD record(s) constructed in **4.4.4.2.4(b)** of the Technical Standard to "4" (assumed from unidentified profile).

Raven's Rule: 4.1.5 Non-Authenticated Driving of a CMV:

a) When a driver is not logged into the ELD all driving of a CMV is associated with an "unidentified driver" account in the ELD system.

b) If a driver hasn't logged into the ELD and starts driving, the ELD must:

- Display a warning on the screen or through both visual and audible alerts, reminding the driver to stop and log into the ELD. - Record the accumulated time for driving and on-duty not-driving activities under the unidentified driver profile, using the default parameters in section **4.4.1** of the Technical Standard.

- Only allow the driver to respond to the authentication prompt and not enter any other information into the ELD.

Raven's Rule: 4.4.4.2.4 Driver's Assumption of Unidentified Driver Logs:

When a driver reviews and accepts ELD records that were initially recorded under the unidentified driver profile, the ELD must:

a) Identify the specific ELD record(s) that were recorded under the unidentified driver profile and will be reassigned to the driver.

b) Use the information from the unidentified driver records and gather input from the driver to fill in any missing details in those records, creating new event records for the driver.

c) Change the "event record status" of the modified ELD records, originally recorded under the unidentified driver profile, to "2" which means inactive.

d) Set the "event record status" of the newly created event records, using the driver's input, to "1" indicating they are active.

e) Mark the "event record origin" of the newly created event records as "4" which means they were assumed from the unidentified driver profile.

4.6.1.6 Monitoring Records Recorded under the Unidentified Driver Profile

a) When there are ELD records involving driving time recorded under the unidentified driver profile, the ELD must prompt the driver(s) logging in with a warning indicating the existence of new unassigned driving time.

b) The ELD must provide a mechanism for the driver to review and either acknowledge the assignment of one or more of the unidentified drivers records attributable to the driver under the authenticated driver's profile as described in
4.3.2.8.2 (c)(1) of the Technical Standard or indicate that these records are not attributable to the driver.

c) If more than 30 minutes of driving in a 24-hour period show unidentified driver on the ELD, the ELD must detect and record an unidentified driving records data diagnostic event and the data diagnostic indicator must be turned on for all drivers authenticated into that ELD for the current day and the following 14 days.

d) An unidentified driving records data diagnostic event can be cleared by the ELD when driving time recorded under the unidentified driver profile for the current day and the required previous days specified in current Hours of Service regulation drops to 15 minutes or less.

Raven's Rule: a) When driving time is recorded under the unidentified driver profile, the ELD will alert the driver that is logged in that there is new unassigned driving time.

b) The ELD will allow th<mark>e driver to review</mark> the unidentified driving records and either accept that th<mark>ey belong to them or i</mark>ndicate that they are not their records.

c) If there is more than 30 minutes of unidentified driving recorded within a 24hour period, the ELD will detect and record a data diagnostic event, and the indicator will be turned on for all drivers logged into the ELD for the current day and the following 14 days.

d) The ELD will clear the unidentified driving records data diagnostic event when the driving time recorded under the unidentified driver profile for the current day and previous required days drops to 15 minutes or less.

When reviewing PDF RODS for Audit or investigation any active – unidentified driving record is a violation to the driver and the carrier:

SCHEDULE XVIII

(Sections 1 to 4)

Motor Vehicle Transport Act

Commercial Vehicle Driver'ss Hours of Service Regulations

77(2) (a) Failure to record information associated with record of duty status as required is \$500.00

(b) Failure to require driver to record information associated with record of duty status as required is \$1000.00

87(1) Failure to monitor driver's compliance with the Regulations is \$2000.00

87(2) Failure to take remedial action and record required information is \$2000.00

If a carrier can do 1 thing to clean up their ELDs and increase compliance is to get a handle on the unidentified driving time.

- An unidentified driving event on a ELD device affects every driver that logged into that specific ELD device in the past 14 days. If a carrier has a fleet with multiple drivers operating different vehicles the amount of data could be staggering.
- 2. Time is recorded by the second and all those little seconds add up. If every driver in a 14-day period had 10 minutes here and there through the day that adds up. The data doesn't lie, and the data doesn't go away.

RAVEN'S RULES – MALFUNCTIONS

If a malfunction is not addressed within eight consecutive days, the motor carrier must cease using the device until it is repaired or replaced. This ensures that the ELD is functioning properly and accurately records the driver's hours of service.

To comply with regulations, motor carriers are responsible for ensuring that the ELD installed in their commercial vehicles is in good working order and maintained according to manufacturer or seller specifications. This includes calibration and addressing any malfunctions promptly.

- 4.6 ELD's Self-Monitoring of Required Functions
- 4.6.1.7 Data Transfer Compliance Monitoring
- 4.6.1.1 Power Compliance Monitoring
- 4.3.1.1 Engine Power Status
- 4.6.1.2 Engine Synchronization Compliance Monitoring
- 4.6.1.3 Timing Compliance Monitoring
- 4.6.1.4 Positioning Compliance Monitoring
- 4.6.1.5 Data Recording Compliance Monitoring
- 4.6.1.7 Data Transfer Compliance Monitoring
- 4.6.1.8 Other Technology-Specific Operational Health Monitoring
- 4.6.2.1 Visual Malfunction Indicator

Data Diagnostic Status	Unidentified Driving Records	Malfunction Status	
(Status & Diagnostic Code)	(0: none, 1: active)	(Status & Malfunction Code)	
1 (Code 2)	1	0	Γ

Hours of Service Malfunction

78 (1) A motor carrier shall ensure that any ELD that is installed or used in a commercial vehicle that it operates is in good working order and is calibrated and maintained in accordance with the manufacturer or seller specifications.

The difference between a data diagnostic event and a malfunction is a data diagnostic event is a record of non-compliance or data issues, while a malfunction refers to an ELD not functioning correctly and indicating its malfunction status.

A data diagnostic event is a situation where the ELD identifies instances of noncompliance or issues with the data it receives or records. These events are recorded by the ELD and may indicate potential problems or discrepancies in the data. A unresolved data diagnostic event will eventually turn into a malfunction if ignored.

A malfunction is a situa<mark>tion where the ELD is not functioning properly or has an active malfunction that affects its integrity and compliance. The ELD is required to indicate its malfunction status to all drivers using it through a visual indicator.</mark>

There are two main challenges that come with malfunctions. First a malfunction affects the ELD device and all drivers that log in to that specific device will record a malfunction until it is dealt with. The longer a ELD is in a malfunction status the more often the device is required to "check-in" with the engine in response to the malfunction.

4.6 ELD's Self-Monitoring of Required Functions:

An ELD must have the capability to monitor its compliance with the technical requirements of the Technical Standard for the detectable malfunctions and data inconsistencies listed in **Table 4** of the Technical Standard and must keep records of its malfunction and data diagnostic event detection.

This review is each Malfunction from **Table 4**.

Note: Event Record Status 1 means it is active.

Table 4 Standard Coding for Required Compliance Malfunction

Malfunction Description

P Power compliance malfunction

- **E** Engine synchronization compliance malfunction
- T Timing compliance malfunction
- L Positioning compliance malfunction
- **R** Data recording compliance malfunction
- **S** Data transfer compliance malfunction
- **O** Other ELD detected malfunction

4.6.1.7 Data Transfer Compliance Monitoring

a) An ELD must implement in-service monitoring functions to verify that the data transfer mechanism(s) described in **4.9.1** of the Technical Standard are continuing to function properly. An ELD must verify this functionality at least once every 7 days. These monitoring functions may be automatic or may involve manual steps for a driver.

b) If the monitoring mechanism fails to confirm proper in-service operation of the data transfer mechanism(s), an ELD must record a data transfer data diagnostic event and enter an unconfirmed data transfer mode.

c) After an ELD records a data transfer data diagnostic event, the ELD must increase the frequency of the monitoring function to check at least once every 24-hour period. If the ELD stays in the unconfirmed data transfer mode following the next three consecutive monitoring checks, the ELD must record a data transfer compliance malfunction.

P Power compliance malfunction

4.6.1.1 Power Compliance Monitoring

a) An ELD must monitor data it receives from the engine ECM or alternative sources as allowed in **4.3.1.1** to **4.3.1.4** of the Technical Standard, its onboard sensors, and data record history to identify instances when it may not have complied with the power requirements specified in **4.3.1.1**, in which case, the ELD must record a power data diagnostics event for the corresponding driver(s), or under the unidentified driver profile if no drivers were authenticated at the time of detection.

b) An ELD must set a power compliance malfunction if the power data diagnostics event described in **4.6.1.1(a)** of the Technical Standard indicates an aggregated driving time understatement of 30 minutes or more on the ELD over a 24-hour period across all driver profiles, including the unidentified driver

profile.

3.1.5 Ignition Power Cycle, Ignition Power on Cycle, Ignition Power Off Cycle

a) An ignition power cycle refers to the engine's power status changing from "on to off" or "off to on", typically with the driver controlling engine power status by switching the ignition key positions.

b) An ignition power on cycle refers to the engine power sequence changing from "off to on and then off". This refers to a continuous period when a CMV's engine is powered.

c) An ignition power off cycle refers to the engine power sequence changing from "on to off and then on". This refers to a continuous period when a CMV's engine is not powered.

4.3.1.1 Engine Power Status

An ELD must be powered on and become fully functional within 1 minute of the vehicle's engine receiving power and must remain powered for as long as the vehicle's engine stays powered.

Raven's Rule: Power Compliance Monitoring ensures a ELD device is accurately monitoring the power requirements of the engine and recording the data correctly.

a) The ELD constantly checks the data it receives from the ECM (or other sources allowed) and its onboard sensors, as well as the historical data records. It looks for any instances where it may not have followed the power requirements specified. If it finds any issues, it creates a record called a power data diagnostics event for the corresponding driver(s). If no drivers were logged in at the time, it records the event under the unidentified driver profile.

b) If the power data diagnostics event shows that the ELD has underestimated the total driving time by 30 minutes or more over a 24-hour period, including all driver profiles and the unidentified driver profile, the ELD sets a power compliance malfunction. This malfunction indicates that the device is not accurately recording the driving time and needs to be addressed.

Ignition Power Cycle, Ignition Power on Cycle, Ignition Power Off Cycle

a) An ignition power cycle occurs when the engine's power status changes from either "on to off" or "off to on". This usually happens when the driver controls the engine's power status by turning the ignition key.

b) An ignition power on cycle happens when the engine's power sequence changes from "off to on and then off". This refers to a continuous period when the engine of a CMV is powered.

c) An ignition power off cycle occurs when the engine's power sequence changes from "on to off and then on". This refers to a continuous period when the engine of a CMV is not powered.

E Engine synchronization compliance malfunction

E Engine synchronization compliance malfunction; 4.6.1.2 Engine Synchronization Compliance Monitoring

4.6.1.2 Engine Synchronization Compliance Monitoring

a) An ELD must monitor the data it receives from the ECM or alternative sources as allowed in **4.3.1.1** to **4.3.1.4** of the Technical Standard, its onboard sensors, and data record history to identify instances and durations of its non-compliance with

the ELD engine synchronization requirement specified in **4.2**, in which case, the ELD must record an engine-synchronization data diagnostics

event.

b) An ELD required to establish a link to the ECM as described in **4.2** must monitor its connectivity to the ECM and its ability to retrieve the vehicle parameters described under **4.3.1** of the Technical Standard and must record an engine-synchronization data diagnostics event when it no longer can acquire updated values for the ELD parameters required for records within 60 seconds of the need.

c) An ELD must set an engine synchronization compliance malfunction if connectivity to any of the required data sources specified in **4.3.1** of the Technical Standard is lost for more than 30 minutes during a 24-hour period aggregated across all driver profiles, including the unidentified driver profile.

d) If the ELD is implemented on a handheld unit and cannot establish a link to the engine ECM when the CMV's engine is not powered or when the ELD is away from the CMV:

1) The ELD must notify the driver that it cannot capture required data elements from the ECM and monitor the engine power status and vehicle motion status as specified in **4.3.1.1** and **4.3.1.2** of the Technical Standard.

2) At the beginning of a new period when the ELD is operated without a link to the ECM, the ELD must prompt the driver to acknowledge and confirm that no link to the ECM may have an impact on data recording and compliance to current Hours of Service regulations.

3) The connectivity status with the ECM must be indicated to all drivers who may use that ELD. The ELD must provide a recognizable visual indicator, and may provide an audible signal, to the driver as to its limited connectivity status.

4) The ECM connectivity status must be continuously communicated to the driver when the ELD is powered.

Raven's Rule: Engine Synchronization Compliance Monitoring ensures the ELD is properly synchronized with the engine to the CMV to accurately record the driver compliance.

a) The ELD constantly checks the data it receives from the ECM or alternative sources, as well as its own onboard sensors and data history, to identify any instances where it is not compliant with the ELD engine synchronization requirement. If a non-compliance is detected, the ELD records an enginesynchronization data diagnostics event.

b) If the ELD is required to establish a connection with the ECM, it continuously monitors its connectivity and ability to retrieve vehicle parameters. If it fails to acquire updated values within 60 seconds, the ELD records an enginesynchronization data diagnostics event.

c) If the connectivity to any required data sources is lost for more than 30 minutes within a 24-hour period, the ELD sets an engine synchronization compliance malfunction. This applies to all driver profiles, including the unidentified driver profile.

d) If the ELD is used on a handheld device and cannot establish a link to the engine ECM when the engine is not powered or when the ELD is away from the CMV:

1) The ELD notifies the driver that it cannot capture required data from the ECM and monitor the engine's power and vehicle's motion status.

2) At the start of a new period without a link to the engine ECM, the ELD prompts the driver to acknowledge and confirm that this may affect data recording and compliance.

4) The ECM connectivity status is continuously communicated to the driver when the ELD is powered.

T Timing compliance malfunction

T Timing compliance malfunction: 4.6.1.3 Timing Compliance Monitoring

4.6.1.3 Timing Compliance Monitoring

The ELD must periodically cross-check its compliance with the requirement specified in **4.3.1.5** of the Technical Standard with respect to an accurate external UTC source and must record a timing compliance malfunction when it can no longer meet the underlying compliance requirement.

The ELD is required to regularly check if it is accurately synchronized with a reliable time source called UTC (Coordinated Universal Time). If the ELD fails to meet the timing requirement specified in the Technical Standard, it must report a malfunction. This means that the ELD must constantly ensure that it is accurately recording and tracking time according to the correct time source within a 10-minute tolerance.

L Positioning compliance malfunction

L Positioning compliance malfunction: 4.6.1.4 Positioning Compliance Monitoring

4.6.1.4 Positioning Compliance Monitoring

a) An ELD must continually monitor the availability of valid position measurements meeting the listed accuracy requirements in **4.3.1.6** of the Technical Standard and must track the distance and elapsed time from the last valid measurement point.

b) ELD records requiring location information must use the last valid position measurement and include the latitude/longitude coordinates and distance traveled, in kilometers, since the last valid position measurement.

c) An ELD must monitor elapsed time during periods when the ELD fails to acquire a valid position measurement within 8 kilometers of the CMV's movement. When such elapsed time exceeds a cumulative 60 minutes over a 24-hour period, the ELD must set and record a positioning compliance malfunction.

d) If a new ELD event must be recorded at an instance when the ELD had failed to acquire a valid position measurement within the most recent elapsed 8 kilometers of driving, but the ELD has not yet set a positioning compliance malfunction, the ELD must record "X" in the latitude and longitude fields, unless location is entered manually, in which case it must record "M" instead. Under the circumstances listed in the Technical Standard, if the ELD event is due to a change in duty status for the driver, the ELD must prompt the driver to enter location manually in accordance with **4.3.2.7** of the Technical Standard. If the driver does not enter the

location information and the vehicle is in motion, the ELD must record a missing required data element data diagnostic event for the driver.

e) If a new ELD event must be recorded at an instance when the ELD has set a positioning compliance malfunction, the ELD must record "E" in the latitude and longitude fields regardless of whether the driver is prompted and manually enters location information.

Raven's Rule: Positioning Compliance Monitoring is used to ensure that the ELD has accurate position measurements that are available and recorded correctly.

a) The ELD continuously checks if there are accurate measurements of the vehicle's position according to specific accuracy requirements.

b) When recording events that require location information, the ELD uses the latest valid position measurement and includes latitude/longitude coordinates and the distance traveled since the last valid position measurement.

c) If the ELD fails to acquire a valid position measurement within 8 kilometers of the vehicle's movement for a cumulative total of 60 minutes within a 24-hour period, it sets and records a compliance malfunction.

d) If an event needs to be recorded but the ELD has failed to acquire a valid position measurement within the last 8 kilometers of driving without setting a compliance malfunction, the ELD records "X" in the latitude and longitude fields. If the driver manually enters the location, it records "M" instead. If the event involves a change in the driver's duty status, the ELD prompts the driver to enter the location manually. If no location is entered and the vehicle is in motion, a missing data diagnostic event is recorded.

e) If an event needs to be recorded when there is a positioning compliance malfunction, the ELD records "E" in the latitude and longitude fields, regardless of whether the driver manually enters the location.

R Data recording compliance malfunction

R Data recording compliance malfunction: 4.6.1.5 Data Recording Compliance Monitoring

4.6.1.5 Data Recording Compliance Monitoring

a) An ELD must monitor its storage capacity and integrity and must detect a data recording compliance malfunction if it can no longer record or retain required events or retrieve records that are not otherwise catalogued remotely by the motor carrier.

b) An ELD must monitor the completeness of the ELD event record information in relation to the required data elements for each event type and must record a missing data elements data diagnostics event for the driver if any required field is missing at the time of recording.

Raven's Rule: An Electronic Logging Device (ELD) must keep track of its storage capacity and integrity. If the ELD is no longer able to record or keep necessary events, or if it cannot retrieve records that are not stored remotely by the motor carrier, it must detect and report a malfunction. Additionally, the ELD must check that all required data elements are included in the event records. If any necessary field is missing during recording, the ELD must create a record indicating the missing data for the driver.

S Data transfer compliance malfunction

S Data transfer compliance malfunction: 4.6.1.7 Data Transfer Compliance Monitoring

4.6.1.7 Data Transfer Compliance Monitoring

a) An ELD must implement in-service monitoring functions to verify that the data transfer mechanism(s) described in **4.9.1** of the Technical Standard are continuing to function properly. An ELD must verify this functionality at least once every 7 days. These monitoring functions may be automatic or may involve manual steps for a driver.

b) If the monitoring mechanism fails to confirm proper in-service operation of the data transfer mechanism(s), an ELD must record a data transfer data diagnostic event and enter an unconfirmed data transfer mode.

c) After an ELD records a data transfer data diagnostic event, the ELD must increase the frequency of the monitoring function to check at least once every 24-

hour period. If the ELD stays in the unconfirmed data transfer mode following the next three consecutive monitoring checks, the ELD must record a data transfer compliance malfunction.

Raven's Rule: Data Transfer Compliance Monitoring ensures the proper functioning of the data transfer mechanism in an ELD.

a) The ELD must regularly check if the data transfer mechanism is working correctly. This verification is done at least once every 7 days.

b) If the monitoring fails to confirm that the data transfer is operating properly, the ELD must record a diagnostic event related to the data transfer. It will also enter an "unconfirmed data transfer mode", indicating that the data transfer may not be reliable.

c) After recording a data transfer diagnostic event, the ELD must increase the monitoring frequency and check at least once every 24-hour period. If the unconfirmed data transfer mode continues for three consecutive monitoring checks, the ELD must record a "data transfer compliance malfunction" to indicate a persistent issue with the data transfer reliability.

O Other ELD detected malfunction: 4.6.1.8 Other Technology-Specific Operational Health Monitoring

4.6.1.8 Other Technology-Specific Operational Health Monitoring

In addition to the required monitoring schemes described in **4.6.1.1** to **4.6.1.7** of the Technical Standard, the ELD provider may implement additional, technology-specific malfunction and data diagnostic detection schemes and may use the ELD's malfunction status indicator and data diagnostic status indicator (described in **4.6.2.1** and **4.6.3.1**) to communicate the ELD's malfunction or non-compliant state to the operator(s) of the ELD.

4.6.2.1 Visual Malfunction Indicator

a) An ELD must display a single visual malfunction indicator for all drivers using the ELD on the ELD's display or on a stand-alone indicator. The visual signal must be visible to the driver when the driver is seated in the normal driving position.

b) The ELD malfunction indicator must be clearly illuminated when there is an active malfunction on the ELD.

c) The malfunction status must be continuously communicated to the driver when the ELD is powered.

DRIVER'S RESPONSIBILTY MALFUNCTION

(2) If a driver of a commercial vehicle becomes aware of the fact that the ELD is displaying a malfunction or data diagnostic code set out in Table 4 of Schedule 2 of the Technical Standard, the driver shall notify the motor carrier that is operating the commercial vehicle as soon as the vehicle is parked.

(3) The driver shall record, in the record of duty status on the day on which they noticed the malfunction or data diagnostic code, the following information:

(a) the malfunction or data diagnostic code as set out in **Table 4** of Schedule 2 of the Technical Standard.

(b) the date and time when the malfunction or data diagnostic code was noticed; and

(c) the time when notification of the malfunction or data diagnostic code was transmitted to the motor carrier.

(4) The driver shall record the code referred to in paragraph (3)(a) in each record of duty status following the day on which the code was noticed, until the ELD is repaired or replaced.

Raven's Rule: When a driver of a commercial vehicle realizes the ELD is showing an error or data diagnostic code listed in **Table 4** of Schedule 2 of the Technical Standard, the driver must promptly inform the motor carrier once the driver is parked.

The driver needs to include the following details in the RODS for the day they noticed the problem:

(a) The specific error or data diagnostic code from **Table 4** of Schedule 2.

(b) The date and time when they noticed the error or code.

(c) The time when they informed the motor carrier about the error or code.

From the day the driver notices the error or code until the ELD is fixed or replaced, the driver must continue to record the code mentioned in point (3)(a) in each RODS.

MOTOR CARRIER RESPONSIILITY MALFUNCTION:

(5) A motor carrier shall, within 14 days after the day on which it was notified of an ELD malfunction or data diagnostic code by the driver or otherwise became aware of it, or at the latest, upon return of the driver to the home terminal from a planned trip if that return exceeds the 14- day period, repair or replace the ELD.

(6) The motor carrier shall maintain a register of ELD malfunction or data diagnostic codes for ELDs installed or used in commercial vehicles that it operates for which a malfunction was noticed, and that register shall contain the following information:

(a) the name of the driver who noticed the malfunction or data diagnostic code.

(b) the name of each driver that used the commercial vehicle following the discovery of the malfunction or data diagnostic code until the ELD was repaired or replaced.

(c) the make, model, and serial number of the ELD.

(d) the license plate of the commercial vehicle in which the ELD is installed or used, or the Vehicle Identification Number.

(e) the date when the malfunction or data diagnostic code was noticed and the location of the commercial vehicle on that date, as well as the date when the motor carrier was notified or otherwise became aware of the code; (f) the date the ELD was replaced or repaired; and (g) a concise description of the actions taken by the motor carrier to repair or replace the ELD.

(7) The motor carrier shall retain the information set out in subsection (6) for each ELD for which a malfunction was noticed for a period of 6 months from the day on which the ELD is replaced or repaired.

Raven's Rule: When the motor carrier is notified by the driver or becomes aware of the malfunction or data diagnostic code, they have 14 days to repair or replace the ELD. If the driver returns to the home terminal from a planned trip after the 14-day period, the repair or replacement should be done at that time.

The motor carrier needs to keep a register of ELD malfunctions or data diagnostic codes for the commercial vehicles they operate. This register should include the following information:

- The name of the driver who noticed the malfunction or code.

- The names of all drivers who used the commercial vehicle after the malfunction was discovered until the ELD was fixed.

- The make, model, and serial number of the ELD.

- The license plate or Vehicle Identification Number of the commercial vehicle.

- The date and location when the malfunction or code was noticed, as well as the date when the carrier was notified or became aware of it.

- The date when the ELD was replaced or repaired, and a brief description of the actions taken to fix it.

The motor carrier must keep this information for each ELD with a malfunction for 6 months from the date of replacement or repair.

SCHEDULE XVIII

(Sections 1 to 4)

Motor Vehicle Transport Act

Commercial Vehicle Driver's Hours of Service Regulations

78(1) Failure to ensure ELD operates in good working order and is calibrated and maintained is \$1000.00

78(2) Failure to notify motor carrier ELD is displaying malfunction or data diagnostic code is \$500.00

78(3) Failure to record required information is \$500.00

78(4) Failure to record malfunction or data diagnostic code as required is \$500.00

78(5) Failure to repair or replace ELD within required time is \$1000.00

78(6) Failure to maintain register containing the required information is \$600.00

If an inspector could determine a driver unplugged the ELD or disconnected the device from Bluetooth to impede the ELD communicating with the ECM that would be tampering.

86(3) (a) Tamper with ELD is \$1000.00

(b) Request, require or allow person to tamper with ELD is \$2000.00

Tampering

86 (1) No motor carrier shall request, require, or allow a driver to keep, and no driver shall keep more than one record of duty status in respect of any day.

(2) No motor carrier shall request, require, or allow any person to enter, and no person shall enter, inaccurate information in a record of duty status or falsify, mutilate, obscure, alter, delete, destroy, or deface the records or supporting documents.

(3) No motor carrier shall request, require, or allow any person to, and no person shall, disable, deactivate, disengage, jam, or otherwise block or degrade a signal transmission or reception, or re-engineer, reprogram or otherwise tamper with an ELD so that the device does not accurately record and retain the data that is required to be recorded and retained

RAVEN'S RULES – DATA DIAGNOSTIC

Motor carriers are required to ensure that any ELD installed or used in their commercial vehicles is in good working order and calibrated and maintained as per the manufacturer or seller specifications. A data diagnostic event records instances of non-compliance or data issues. Data diagnostic events can help identify potential problems or discrepancies in the data recorded by the ELD.

A data diagnostic error refers to an event or situation where the ELD detects noncompliance or issues with the data it receives or records. These errors are recorded by the ELD and serve as indications of potential problems or discrepancies in the recorded data. Examples of data diagnostic errors can include missing or inaccurate information, gaps in driving logs, or inconsistencies between the ELD data and the actual operations of the commercial vehicle. These errors are intended to alert motor carriers and drivers to possible issues that need to be addressed to ensure compliance. Data diagnostic events if left unattended will turn into Malfunctions.

- 4.6.1.1 Power Compliance Monitoring
- 4.6.1.2 Engine Synchronization Compliance Monitoring
- 3 Missing required data elements data diagnostic event
- 4 Data transfer data diagnostic event
- 4.6.1.6 Monitoring Records Recorded under the Unidentified Driver Profile
- 4.6.1.8 Other Technology-Specific Operational Health Monitoring

Data Diagnostic Status	Unidentified Driving Records	Malfunction Status
(Status & Diagnostic Code)	(0: none, 1: active)	(Status & Malfunction Code)
1 (Code 2)	1	0

Table 4

Standard Coding for Required Compliance Data Diagnostic Event Detection

- 1 Power data diagnostic event
- 2 Engine synchronization data diagnostic event
- 3 Missing required data elements data diagnostic event
- 4 Data transfer data diagnostic event
- 5 Unidentified driving records data diagnostic events
- 6 Other ELD identified diagnostic events

Data Diagnostic Event

78 (1) A motor carrier shall ensure that any ELD that is installed or used in a commercial vehicle that it operates is in good working order and is calibrated and maintained in accordance with the manufacturer or seller specifications.

The difference between a data diagnostic event and a malfunction is a data diagnostic event is a record of non-compliance or data issues, while a malfunction refers to an ELD not functioning correctly and indicating its malfunction status.

A data diagnostic event is a situation where the ELD identifies instances of noncompliance or issues with the data it receives or records. These events are recorded by the ELD and may indicate potential problems or discrepancies in the data.

Note: Event Record Status 1 means it is active.

4.6.1 Compliance Self-Monitoring and Data Diagnostic Events

1 Power data diagnostic event

4.6.1.1 Power Compliance Monitoring

a) An ELD must monitor data it receives from the engine ECM or alternative sources as allowed in **4.3.1.1** to **4.3.1.4** of the Technical Standard, its onboard sensors, and data record history to identify instances when it may not have complied with the power requirements specified in **4.3.1.1**, in which case, the ELD must record a power data diagnostics event for the corresponding driver(s), or under the unidentified driver profile if no drivers were authenticated at the time of detection.

b) An ELD must set a power compliance malfunction if the power data diagnostics event described in **4.6.1.1(a)** of the Technical Standard indicates an aggregated driving time understatement of 30 minutes or more on the ELD over a 24-hour period across all driver profiles, including the unidentified driver profile.
Raven's Rules: Power Compliance Monitoring ensures a ELD device is accurately monitoring the power requirements of the engine and recording the data correctly.

a) The ELD constantly checks the data it receives from the ECM (or other sources allowed) and its onboard sensors, as well as the historical data records. It looks for any instances where it may not have followed the power requirements. If it finds any issues, it creates a record called a power data diagnostics event for the corresponding driver(s). If no drivers were logged in at the time, it records the event under the unidentified driver profile.

b) If the power data diagnostics event shows that the ELD has underestimated the total driving time by 30 minutes or more over a 24-hour period, including all driver profiles and the unidentified driver profile, the ELD sets a power compliance malfunction. This malfunction indicates that the device is not accurately recording the driving time and needs to be addressed.

2 Engine synchronization data diagnostic event

4.6.1.2 Engine Synchronization Compliance Monitoring

a) An ELD must monitor the data it receives from the engine ECM or alternative sources as allowed in **4.3.1.1** to **4.3.1.4** of the Technical Standard, its onboard sensors, and data record history to identify instances and durations of its non-compliance with the ELD engine synchronization requirement specified in **4.2**, in which case, the ELD must record an engine-synchronization data diagnostics

event.

b) An ELD required to establish a link to the engine ECM as described in **4.2** must monitor its connectivity to the engine ECM and its ability to retrieve the vehicle parameters described under **4.3.1** of the Technical Standard and must record an engine-synchronization data diagnostics event when it no longer can acquire updated values for the ELD parameters required for records within 60 seconds of the need.

c) An ELD must set an engine synchronization compliance malfunction if connectivity to any of the required data sources specified in **4.3.1** of the Technical

Standard is lost for more than 30 minutes during a 24-hour period aggregated across all driver profiles, including the unidentified driver profile.

d) If the ELD is implemented on a handheld unit and cannot establish a link to the engine ECM when the CMV's engine is not powered or when the ELD is away from the CMV:

1) The ELD must notify the driver that it cannot capture required data elements from the engine ECM and monitor the engine's power status and vehicle's motion status as specified in **4.3.1.1** and **4.3.1.2** of the Technical Standard.

2) At the beginning of a new period when the ELD is operated without a link to the engine ECM, the ELD must prompt the driver to acknowledge and confirm that no link to the engine ECM may have an impact on data recording and compliance to current Hours-Of-Service regulations.

3) The connectivity status with the engine ECM must be indicated to all drivers who may use that ELD. The ELD must provide a recognizable visual indicator, and may provide an audible signal, to the driver as to its limited connectivity status.

4) The ECM connectivity status must be continuously communicated to the driver when the ELD is powered.

Raven's Rule: Engine Synchronization Compliance Monitoring ensures the ELD is properly synchronized with the engine to the CMV to accurately record the driver's Hours of Service compliance.

a) The ELD constantly checks the data it receives from the engine ECM or alternative sources, as well as its own onboard sensors and data history, to identify any instances where it is not compliant with the ELD engine synchronization requirement. If a non-compliance is detected, the ELD records an engine-synchronization data diagnostics event.

b) If the ELD is required to establish a connection with the engine ECM, it continuously monitors its connectivity and ability to retrieve vehicle parameters required. If it fails to acquire updated values within 60 seconds, the ELD records an engine-synchronization data diagnostics event. c) If the connectivity to any required data sources is lost for more than 30 minutes within a 24-hour period, the ELD sets an engine synchronization compliance malfunction. This applies to all driver profiles, including the unidentified driver profile.

d) If the ELD is used on a handheld device and cannot establish a link to the engine ECM when the engine is not powered or when the ELD is away from the CMV:

1) The ELD notifies the driver that it cannot capture required data elements from the engine ECM and monitor the engine's power status and vehicle's motion status.

2) At the start of a new period without a link to the ECM, the ELD prompts the driver to acknowledge and confirm that this may affect data recording and compliance.

3) The ELD indicates the connectivity status with the ECM to all drivers who may use it. This can be done through a visual indicator and optionally an audible signal.

4) The ECM connectivity status is continuously communicated to the driver when the ELD is powered.

3 Missing required data elements data diagnostic event

Technical Standard **4.5.1 a)** An ELD must record data for all distinct events specified in **4.5.1.1 – 4.5.1.11** of the Technical Standard.

For each one of the events, 1 – 11 the event has required data. Not all events need the same data. If data is missing or corrupt it may cause a data diagnostic error.

4 Data transfer data diagnostic event

4.6.1.7 Data Transfer Compliance Monitoring

a) An ELD must implement monitoring functions to verify that the data transfer mechanism(s) described in **4.9.1** of the Technical Standard are continuing to function properly. An ELD must verify this functionality at least once every 7 days.

These monitoring functions may be automatic or may involve manual steps for a driver.

b) If the monitoring mechanism fails to confirm proper in-service operation of the data transfer mechanism(s), an ELD must record a data transfer data diagnostic event and enter an unconfirmed data transfer mode.

c) After an ELD records a data transfer data diagnostic event, the ELD must increase the frequency of the monitoring function to check at least once every 24-hour period. If the ELD stays in the unconfirmed data transfer mode following the next three consecutive monitoring checks, the ELD must record a data transfer compliance malfunction.

Raven's Rule: Data Transfer Compliance Monitoring ensures the proper functioning of the data transfer mechanism in an ELD.

a) The ELD must have monitoring to regularly check if the data transfer mechanism is working correctly. This verification must be done at least once every 7 days. The monitoring can be automatic or require some manual steps by the driver.

b) If the monitoring mechanism fails to confirm that the data transfer is operating properly, the ELD must record a diagnostic event related to the data transfer. It will also enter an "unconfirmed data transfer mode", indicating that the data transfer may not be reliable.

c) After recording a data transfer diagnostic event, the ELD must increase the monitoring frequency and check at least once every 24-hour period. If the unconfirmed data transfer mode continues for three consecutive monitoring checks, the ELD must record a "data transfer compliance malfunction" to indicate a persistent issue with the data transfer reliability.

5 Unidentified driving records data diagnostic events: refer to Raven'ss Recap Unidentified Driving. 4.6.1.6 Monitoring Records Recorded under the Unidentified Driver Profile

a) When there are ELD records involving driving time recorded on an ELD under the unidentified driver profile, the ELD must prompt the driver(s) authenticating in with a warning indicating the existence of new unassigned driving time.

b) The ELD must provide a mechanism for the driver to review and either acknowledge the assignment of one or more of the unidentified driver records attributable to the driver under the authenticated driver's profile as described in 4.3.2.8.2 (c)(1) of the Technical Standard or indicate that these records are not attributable to the driver.

c) If more than 30 minutes of driving in a 24-hour period show unidentified driver on the ELD, the ELD must detect and record an unidentified driving records data diagnostic event and the data diagnostic indicator must be turned on for all drivers authenticated into that ELD for the current day and the following 14 days.

d) An unidentified driving records data diagnostic event can be cleared by the ELD when driving time recorded under the unidentified driver profile for the current day and the required previous days specified in the current Hours of Service regulations drops to 15 minutes or less.

6 Other ELD identified diagnostic event.

4.6.1.8 Other Technology-Specific Operational Health Monitoring

In addition to the required monitoring schemes described in **4.6.1.1** to **4.6.1.7** of the Technical Standard, the ELD provider may implement additional, technology-specific malfunction and data diagnostic detection schemes and may use the ELD's malfunction status indicator and data diagnostic status indicator (described in **4.6.2.1** and **4.6.3.1**) to communicate the ELD's malfunction or non-compliant state to the operator(s) of the ELD.

4.6.3.1 Visual Data Diagnostics Indicator

a) An ELD must display a single visual data diagnostics indicator, apart from the visual malfunction indicator described in 4.6.2.1 of Technical Standard, to communicate visually the existence of active data diagnostics events for the applicable driver.

b) The visual signal must be visible to the driver when the driver is seated in the normal driving position

SCHEDULE XVIII

(Sections 1 to 4)

Motor Vehicle Transport Act

Commercial Vehicle Drivers Hours of Service Regulations

78(1) Failure to ensure ELD operates in good working order and is calibrated and maintained is \$1000.00

78(2) Failure to notify motor carrier ELD is displaying malfunction or data diagnostic code is \$500.00

78(3) Failure to record required information is \$500.00

78(4) Failure to record malfunction or data diagnostic code as required is \$500.00

If an inspector could determine a driver unplugged the ELD or disconnected the device from Bluetooth to impede the ELD communicating with the ECM that would be tampering.

86(3) (a) Tamper with ELD is \$1000.00

(b) Request, require or allow person to tamper with ELD is \$2000.00

Tampering

86 (1) No motor carrier shall request, require or allow a driver to keep, and no driver shall keep more than one record of duty status in respect of any day.

(2) No motor carrier shall request, require, or allow any person to enter, and no person shall enter, inaccurate information in a record of duty status or falsify, mutilate, obscure, alter, delete, destroy, or deface the records or supporting documents.

(3) No motor carrier shall request, require, or allow any person to, and no person shall, disable, deactivate, disengage, jam, or otherwise block or degrade a signal transmission or reception, or re-engineer, reprogram or otherwise tamper with an ELD so that the device does not accurately record and retain the data that is required to be recorded and retained.

RAVEN'S RULES: EVENT DETAILS – READING THE PDF RODS AND INTERPRETING EVENT DETAILS FOR COMPLIANCE

To ensure compliance with the current Hours of Service regulations, motor carriers are required to keep extensive records of their driver's duty status changes, as stated in the Hours of Service Regulations and the Technical Standard. These records must include all the necessary information associated with each event, with some events requiring more supporting data than others. Failure to provide complete data for any of the eleven events may result in a data diagnostic violation. To address potential issues with data recording due to ECM functionality problems, it is highly recommended that carriers and drivers familiarize themselves with the specific data requirements for each event.

4.5 ELD - Recording 4.5.1 Events and Data to Record 4.5.1.1 – 4.5.1.11

- 4.5.1.1 is Change in Driver Duty Status
- 4.5.1.2 is Intermediate Logs

4.5.1.3 Event: Change in Driver Indication of Allowed Conditions that Impact Driving Time Recording

- 4.5.1.4 Event: Driver Certification of Own RODS
- 4.5.1.5 Event: Driver Login/Logout Activity

Hours of Service - Certification of Record of Duty Status 78.2

- 4.5.1.8 Event: Off-Duty Time Deferral
- 4.3.2.3 Driver Certification of RODS

4.5.1.9 Event: Change in Driver Cycle

4.5.1.10 Event: Change in Operating Zone

4.8.2.1.5 ELD Event List for Annotations, Comments, and Driver Location Description

4.5.1.11 Event: Additional Hours Not Recorded

4.3.2.2.4 Indication of Situations Impacting duty-/driving-hour limitations

4.5 ELD - Recording 4.5.1 Events and Data to Record 4.5.1.1 – 4.5.1.11

Hours of Service **77 (2)** The motor carrier shall require the driver to record, and the driver shall record for each day, in accordance with the current Hours of Service Regulations and the Technical Standard, all the information associated with their record of duty status as their duty status changes.

Each event also has required data, some events need a lot of supporting data and some events not as much. There are eleven events, and any missing data may result in a data diagnostic violation. The example charts below from the Hours of Service are divided into different events.

If a carrier has a device that has issues with recording data because of some type of functionality issue with the ECM. I would highly recommend the carrier and driver get familiar with what data is allowed to be missing for each event. One step further would be to provide the driver with written instructions including the pertinent sections of the technical standard in case of a roadside inspection. This first chart we are going to look at includes change of duty status, intermediate logs, personal conveyance, and yard moves. All these events require the same required data, and we will review them together.

Changes in driver's Duty Status, Intermediate Logs and Special Driving Conditions (Personal Use and Yard Moves)												
Date & time	Event	Geo-Location	Latitude, Longitude		Distance last val. coord.	CMV	Distance (Accum.)	Hours (Elapsed)	Distance (Total)	Record Status	Record Origin	Seq. ID
11-19-18												
00:20:12	ON	8 km SSW Montreal QC	36.99	-121.55	0	12345	0	0.0		1	1	1110
00:21:45	YM start	8 km SSW Montreal QC	36.99	-121.55	0	12345	0	0.0	346470	1	1	1111
00:52:52	YM end	8 km SSW Montreal QC	36.99	-121.55	0	12345	1	0.5	346471	1	1	1112
00:53:31	DR	8 km SSW Montreal QC	36.99	-121.55	0	12345	1	0.5		1	1	1113
01:53:31	INT	Geo-Location	40.70	-85.46	0	12345	99	1.5		1	1	0FBB
02:53:31	INT	Geo-Location	41.54	-85.06	0	12345	202	2.5		1	1	0FBC
03:15:28	SB	Rest Area, Mallorytown, HW 401	М	М	9	12345	233	2.9		1	1	0FBD
16:48:29	ON	Geo-Location	45.21	-74.34	0	12345	0	0.0		1	1	0FE2
17:19:15	DR	Geo-Location	45.21	-74.34	0	12345	0	0.2		1	1	0FE6

4.5.1.1 is Change in Driver Duty Status when a driver's duty status changes, the ELD must associate the record with the driver, the record originator, if created during an edit or entry, the vehicle, and the motor carrier. This means if the driver created the event the event will be attributed to the driver. If the event is created during an edit or entry, the vehicle and the carrier. Regardless of who created the event, there are required data elements.

4.5.1.2 is Intermediate Logs

a) When the driver duty status is set to driving, and there has not been a duty status change or another intermediate log recorded in the previous 1-hour period, the ELD must record a new intermediate log event.

b) The ELD must associate the record with each driver (including any authenticated co-driver) or the unidentified driver profile, the vehicle, and the motor carrier, and must include the same data elements outlined in **4.5.1.1** of the Technical Standard except for item (p) in **4.5.1.1**.

4.5.1.1 p) Driver's Location Description as described in 7.12.

Intermediate logs record data two ways: one way with conventional location precision and one way with reduced location precision. The Technical Standards regarding intermediate logs states: **4.6.1.4** Positioning Compliance Monitoring

a) An ELD must continually monitor the availability of valid position measurements meeting the listed accuracy requirements in **4.3.1.6** of the Technical Standard and must track the distance and elapsed time from the last valid measurement point.

b) ELD records requiring location information must use the last valid position measurement and include the latitude/longitude coordinates and distance traveled, in kilometers, since the last valid position measurement.

(personal use and yard move) 4.5.1.3 Event: Change in Driver Indication of Allowed Conditions that Impact Driving Time Recording:

a) At each instance when the status of a driver indication of personal use of CMV or yard moves changes, the ELD must record a new event.

b) The ELD must associate the record with the driver, the vehicle and the motor carrier, and must include required data elements.

The required data elements for 4.5.1.1, 4.5.1.2 and 4.5.1.3 are:

Required Data Elements:

Event Sequence ID Number: use CTRL F to find events for review

Event Record Status: anything with a 2, 3, or 4 needs additional review

Event Record Origin: anything with a 2, 3, or 4 needs additional review

Event Type and Event Code: Print or have **Table 6** and **Table 9** for reference when reviewing RODS.

Event Date and Event Time: always in driver's home terminal

Accumulated Vehicle Distance: If there is no data this needs additional review

Elapsed Engine Hours: If there is no data this needs additional review

Event Latitude and Event Longitude: If there is no data, or a M or a X this needs additional review

Distance Since Last Valid Coordinates: if there is a 0 that is correct, if there is data or a 9, this needs additional review

Malfunction Indicator Status: If there is any data this needs additional review

Data Diagnostic Event Indicator Status for Driver: If there is any data this needs additional review

Event Comment /Annotation: Only certain events require a comment, if there is a comment its good practise to review it. For example, if you notice a driver is logging off duty but writing a comment: unloading or waiting at scale, this would be an incorrect duty status as per the comment.

Driver Location Description: remember the ELD is supposed the be recording data automatically and if a location description is required by the driver, it's because the ELD isn't getting the location from the ECM, and this needs additional review

Event Data Check Value: I'm not a programmer and it seems this is a system check that I ignore.

Exception regarding the recording of data elements in the event records generated by the ELD. This would be a app on a phone or no connection to the ECM.

4.5.1 b) If the driver is using a software application specified in **4.7.4** of the Technical Standard or the ELD is implemented on a handheld unit that did not establish a link to the engine ECM as described in **4.2** of the Technical Standard, data elements from the vehicle engine ECM and the CMV Power Unit Number may be omitted in the records for the following event types and conditions:

(2) A change in Driver duty status, only if the event is triggered by the driver and is not automatically recorded by the ELD, as specified in **4.4.1.1** and **4.4.1.2** of the Technical Standard.

c) When the ELD meets the requirements specified in **4.5.1 (b)** of the Technical Standard, the following data elements may be left blank in the event records if they are not available or cannot accurately be determined:

(1) Vehicle Distance as described in 7.43

- (2) Engine Hours as described in 7.19
- (3) CMV VIN as described in 7.5 and
- (4) CMV Power Unit Number associated with the record as described in 7.4.

d) For each event recorded when a subset of the required data elements is omitted in the RODS, the ELD must prompt the driver to acknowledge and confirm that required data elements were omitted in the event record.

e) For all data elements specified in **4.5.1 (c)** of the Technical Standard that are omitted in the event records, the ELD must not permit alteration of the original information recorded, as specified in **4.3.2.8** of the Technical Standard.

Raven's Rule: 4.5.1 (b), states that if the driver is using a software application specified in **4.7.4** or if the ELD is implemented on a handheld unit without a link to the engine ECM, certain data elements may be omitted from the records for specific event types and conditions. A change in driver duty status, is only exempt if the event is triggered manually by the driver and not automatically recorded by the ELD.

4.5.1 (c) states that when the ELD meets the requirements specified in section **4.5.1 (b)**, certain data elements may be left blank in the event records if they are not available or cannot accurately be determined. The specific data elements are vehicle distance, engine hours, CMV VIN and CMV power unit number.

4.5.1 (d) requires that for each event recorded when a subset of the required data elements is omitted in the records of duty status (RODS), the ELD must prompt the driver to acknowledge and confirm that the required data elements were omitted in the event record.

Any data not listed under the excep<mark>tion is</mark> required no matter what conditions

Raven's Rule: 4.5.1.2 A intermediate log is a requirement for a ELD to record events when the driver is in driving status.

a) If the driver has been driving for 1 hour without any changes in the duty status or other intermediate log events, the ELD must record a new intermediate log event.

b) The ELD includes specific information for each recorded event. This includes the driver, co-drivers, the vehicle, and the motor carrier. It should also include all the data elements in **4.5.1.1** of the Technical Standard, except for item (p) which refers to the driver's location description as described in **7.12**.

This second chart includes: login/logout, certification, data diagnostics and malfunctions.

Login/Logout, Certification of RODS, Data Diagnostics and Malfunctions										
Date & time	Event	Additional info	CMV	Distance (Total)	Hours (Total)	Seq. ID				
11-19-18										
00:18:54	Login		12345	346470	6386.1	10FF				
12:05:51	Data Diagnostic (detected)	Code 2 (Engine synchronization)	12345	346804	6391.4	1096				
12:08:22	Data Diagnostic (cleared)	Code 2 (Engine synchronization)	12345	346804	6391.5	1097				
18:28:55	Certification of RODS	Time Zone: EST (UTC -05:00)	12345			1102				
18:29:33	Logout		12345	346943	6395.8	112F				
11-20-18										
07:41:22	Re-Certification of RODS (1)	Time Zone: EST (UTC -05:00)	12345	-	-	1222				

Change in Driver's Cycle. Change in Operating Zone, Off-Duty Time Deferral											
Date & time	Event	Geo-Location	Latitude	, Longitude	Distance last val. coord.	CMV	Record Status	Record Origin	Seq. ID		
11-19-18											
00:19:15	Cycle 1 (7 days)					12345	1	3	1089		
02:05:41	Operating Zone 1 (South of latitude 60°N in Canada)	Geolocation	45.08	-73.42	0	12345	1	1	10FF		
18:27:43	Off-Duty Time Deferral Day 1 (02:00)					12345	1	1	1201		

4.5.1.5 Event: Driver Login/Logout Activity

a) At each instance when an authorized user authenticates in and out of the ELD, the ELD must record the event.

b) The ELD must associate the record with the driver, the vehicle, and the motor carrier, and must include the following data elements:

(1) Event Sequence ID Number as described in 7.24

(2) Event Type as described in **7.25** have **Table 6** and **Table 9** for reference when reviewing RODS.

(3) Event Code as described in **7.20** have **Table 6** and **Table 9** for reference when reviewing RODS.

(4) Event Date as described in 7.8

(5) Event Time as described in 7.40

(6) Total Vehicle Distance as described in **7.43** If there is no data this needs additional review and

(7) Total Engine Hours as described in **7.19** If there is no data this needs additional review.

Exception regarding the recording of data elements in the event records generated by the ELD. This would be a app on a phone or no connection to the ECM.

4.5.1 b) If the driver is using a software application specified in **4.7.4** of the Technical Standard or the ELD is implemented on a handheld unit that did not establish a link to the engine ECM as described in **4.2** of the Technical Standard, data elements from the vehicle engine ECM and the CMV Power Unit Number may be omitted in the records for the following event types and conditions:

(1) A driver login/logout activity.

Raven's Rule: The ELD must be powered and connected to the ECM within 1 minute of the engine receiving power. Drivers not logging in and out correctly or immediately when the ELD is connected to the ECM cause unidentified driving time. If the ELD is on and receiving power because the engine is on someone needs to log in.

Certification of RODS

Hours of Service - Certification of Record of Duty Status 78.2 A driver shall, immediately after recording the last entry for a day, certify the accuracy of their record of duty status.

Just like the driver had to sign logs at the end of the day in the paper log world the only difference is now the auditor knows for sure the RODS were not certified end of day. If an inspector needs to review a specific time period and you select a date range of RODS to download in PDF and RODS are missing. Those missing RODS may be uncertified. Always clean up uncertified RODS before you download.

4.5.1.4 Event: Driver Certification of Own RODS

a) At each instance when a driver certifies or re-certifies that the driver RODS for a given day are true and correct, the ELD must record the event.

b) The ELD must associate the record with the driver, the vehicle and the motor carrier, and must include the following data elements:

(1) Event Sequence ID Number as described in 7.24

(2) Event Type as described in **7.25** have **Table 6** and **Table 9** for reference when reviewing RODS.

(3) Event Code as described in **7.20** have **Table 6** and **Table 9** for reference when reviewing RODS.

(4) Time Zone Offset from UTC as described in 7.41.

(5) Event Date of the certified RODS as described in 7.8 and

(6) Event Time as described in **7.40**.

4.3.2.3 Driver Certification of RODS

a) An ELD must include a function whereby a driver can certify the RODS at the end of a day.

(1) When this function is selected, the ELD must display a statement that reads I hereby certify that my data entries and my record of duty status for this day are true and correct.

(2) An ELD must prompt the driver to select Agree or Not ready. An ELD must record the Driver affirmative selection of Agree as an event.

b) An ELD must only allow the authenticated driver to certify RODS associated with that driver.

c) If any edits are necessary after the driver certifies the RODS for a given day, the ELD must require and prompt the driver to re-certify the updated RODS.

d) If there are any past RODS on the ELD (excluding the current day) that require certification or recertification by the driver, the ELD must indicate the required driver action on the ELD display and prompt the driver to take the necessary action.

Exception regarding the recording of data elements in the event records generated by the ELD. This would be a app on a phone or no connection to the ECM.

4.5.1 b) If the driver is using a software application specified in **4.7.4** of the Technical Standard or the ELD is implemented on a handheld unit that did not establish a link to the engine ECM as described in **4.2** of the Technical Standard, data elements from the vehicle engine ECM and the CMV Power Unit Number may be omitted in the records for the following event types and conditions:

(3) Driver's certification/re-certification of RODS

4.5.1.7 Event: ELD Malfunction and Data Diagnostics Occurrence

a) At each instance when an ELD malfunction or data diagnostic event is detected or cleared by the ELD, the ELD must record the event.

b) The ELD must associate the record with the driver, the vehicle, and the motor carrier, and must include the following data elements:

(1) Event Sequence ID Number as described in 7.24

(2) Event Type as described in **7.25** have **Table 6** and **Table 9** for reference when reviewing RODS.

(3) Event Code as described in **7.20** have **Table 6** and **Table 9** for reference when reviewing RODS.

(4) Malfunction/Diagnostic Code as described in **7.34** If there is data this needs additional review

(5) Event Date as described in 7.8

(6) Event Time as described in 7.40

(7) Total Vehicle Distance as described in **7.43** If there is no data this needs additional review and

(8) Total Engine Hours as described in **7.19** If there is no data this needs additional review.

SCHEDULE XVIII

(Sections 1 to 4)

Motor Vehicle Transport Act

Commercial Vehicle Driver's Hours of Service Regulations

78.2 Failure to certify accuracy of record of duty status immediately after recording last entry for a day is \$500.00

78.3(1) Failure to verify accuracy of certified records of duty status or require necessary changes is \$1000.00

78.3(2) Failure to make necessary changes to certify accuracy of, and forward, amended records of duty status is \$500.00

Login/Logout, Certification of RODS, Data Diagnostics and Malfunctions										
Date & time	Event	Additional info	CMV	Distance (Total)	Hours (Total)	Seq. ID				
11-19-18										
00:18:54	Login		12345	346470	6386.1	10FF				
12:05:51	Data Diagnostic (detected)	Code 2 (Engine synchronization)	12345	346804	6391.4	1096				
12:08:22	Data Diagnostic (cleared)	Code 2 (Engine synchronization)	12345	346804	6391.5	1097				
18:28:55	Certification of RODS	Time Zone: EST (UTC -05:00)	12345			1102				
18:29:33	Logout		12345	346943	6395.8	112F				
11-20-18										
07:41:22	Re-Certification of RODS (1)	Time Zone: EST (UTC -05:00)	12345			1222				

Change in Driver's Cycle. Change in Operating Zone, Off-Duty Time Deferral											
Date & time	Event	Geo-Location	Latitude	, Longitude	Distance last val. coord.	CMV	Record Status	Record Origin	Seq. ID		
11-19-18											
00:19:15	Cycle 1 (7 days)					12345	1	3	1089		
02:05:41	Operating Zone 1 (South of latitude 60°N in Canada)	Geolocation	45.08	-73.42	0	12345	1	1	10FF		
18:27:43	Off-Duty Time Deferral Day 1 (02:00)					12345	1	1	1201		

The third chart includes: Change in cycle, change in operating zone, off duty time deferral.

4.5.1.9 Event: Change in Driver Cycle

a) At each instance when the cycle changes to either cycle 1 or cycle 2, the ELD must record a new event.

b) The ELD must associate the record with the driver, the record originator, the vehicle, and the motor carrier, and must include the following data elements:

(1) Event Sequence ID Number as described in 7.24

(2) Event Record Status as described in **7.23** anything with a 2, 3, or 4 needs additional review

(3) Event Record Origin as described in **7.22** anything with a 2, 3, or 4 needs additional review

(4) Event Type as described in **7.25** Print **Table 6** and **Table 9** for reference when reviewing RODS.

(5) Event Code as described in **7.20** Print **Table 6** and **Table 9** for reference when reviewing RODS.

(6) Event Date as described in 7.8

(7) Event Time as described in **7.40**

(8) Event Comment /Annotation as described in **7.6** only certain events require a comment, if there is a comment its good practise to review it. and

(9) New Cycle Used as described in 7.36.

Exception regarding the recording of data elements in the event records generated by the ELD. This would be a app on a phone or no connection to the ECM.

4.5.1 b) If the driver is using a software application specified in **4.7.4** of the Technical Standard or the ELD is implemented on a handheld unit that did not establish a link to the engine ECM as described in **4.2** of the Technical Standard, data elements from the vehicle engine ECM and the CMV Power Unit Number may be omitted in the records for the following event types and conditions:

(5) Change in Driver's Cycle

4.5.1.10 Event: Change in Operating Zone

a) At each instance when the operating zone changes, the ELD must record a new event.

b) The ELD must associate the record with the driver, the record originator, the vehicle, and the motor carrier, and must include the following data elements:

(1) Event Sequence ID Number as described in 7.24

(2) Event Record Status as described in **7.23** anything with a 2, 3, or 4 needs additional review

(3) Event Record Origin as described in **7.22** anything with a 2, 3, or 4 needs additional review

(4) Event Type as described in **7.25** Print **Table 6** and **Table 9** for reference when reviewing RODS.

(5) Event Code as described in **7.20** Print **Table 6** and **Table 9** for reference when reviewing RODS.

(6) Event Date as described in **7.8**

(7) Event Time as described in **7.40**

(8) Event Latitude as described in 7.31

(9) Event Longitude as described in 7.33

(10) Distance Since Last Valid Coordinates as described in **7.9** if there is a 0 that is correct, if there is data or a 9, this needs additional review

(11) Event Comment /Annotation as described in **7.6** only certain events require a comment, if there is a comment its good practise to review it.

(12) Driver Location Description as described in **7.12** remember the ELD is supposed the be recording data automatically and if a location description is required by the driver, it's because the ELD isn't getting the location from the ECM, and this needs additional review and

(13) New Operating zone as described in 7.46.

4.5.1.8 Event: Off-Duty Time Deferral

a) At each instance when the Off-duty time deferral status changes, the ELD must record a new event.

b) The ELD must associate the record with the driver, the record originator, the vehicle, and the motor carrier, and must include the following data elements:

(1) Event Sequence ID Number as described in 7.24

(2) Event Record Status as described in **7.23** anything with a 2, 3, or 4 needs additional review

(3) Event Record Origin as described in **7.22** anything with a 2, 3, or 4 needs additional review

(4) Event Type as described in **7.25** Print **Table 6** and **Table 9** for reference when reviewing RODS.

(5) Event Code as described in **7.20** Print **Table 6** and **Table 9** for reference when reviewing RODS.

(6) Event Date as described in **7.8**

(7) Event Time as described in 7.40

(8) Comment /Annotation as described in **7.6** only certain events require a comment, if there is a comment its good practise to review it.

(9) Off-duty Time Deferral Status as described in 7.44 and

(10) Off-duty Time Deferred as described in **7.45**.

Exception regarding the recording of data elements in the event records generated by the ELD. This would be a app on a phone or no connection to the ECM.

4.5.1 b) If the driver is using a software application specified in **4.7.4** of the Technical Standard or the ELD is implemented on a handheld unit that did not establish a link to the engine ECM as described in **4.2** of the Technical Standard, data elements from the vehicle engine ECM and the CMV Power Unit Number

may be omitted in the records for the following event types and conditions:

(4) Off-Duty Time Deferral

Comments, R	emarks and Ann	otations										
Date (MM-DD-YY)	Time (HH: <u>MM:SS</u>)	Seq. No.	Comment or Annotation Edi					Edit D)ate DD-YY)	Edit Time (HH:MM:SS)	Edit Us (origina	ername itor)
11-19-18	07:41:22	1222	Driver error					11-20	-18	07:41:22	sr12345	6
		· · · ·										
Additional Hou	irs not recorded											
Date	Work shift Start (HH:MM)	Work shift End (HH:MM)	Total Hours (On-Duty)	Total Hours (Off-Duty)	CMV	Record Status	Record Origin	d Seq. ID				
11-18-18	00:00	23:59	00:00	24:00	12345	1	2	104E	-			
11-17-18	00:00	23:59	00:00	24:00	12345	1	2	104F				
11-16-18	07:00	17:00	09:00	15:00	12345	1	2	1106	-			
11-15-18	07:00	17:00	09:00	15:00	12345	1	2	1107				
					12345	1	2	1108	-			
11-05-18	07:00	17:00	09:00	15:00	12345	1	2	1109				
									-			
Engine Power	Up and Shut Do	wn										
Date & time	Event		Geo-Location			Latitude, Longitude		Distance last val. coord.	CMV	Distance (Total)	Hours (Total)	Seq. ID
44 40 40												

					coord.		(Total)	(Total)	
11-19-18									
00:18:45	Power Up	8 km SSW Montreal QC	36.99	-121.55	0	12345	346470	6386.1	0FBE
03:16:12	Shut Down	Geo-Location	41.85	-85.00	0	12345	346525	6388.7	0FC3
06:04:22	Power Up	Geo-Location	41.85	-85.00	0	12345	346525	6388.9	0FC4
07:40:12	Shut Down	Geo-Location	41.85	-85.00	0	12345	346608	6389.0	0FC5
07:42:55	Power Up	Geo-Location	41.85	-85.00	0	12345	346608	6389.1	0FC8
07:43:39	Shut Down	Geo-Location	41.85	-85.00	0	12345	346608	6389.1	0FCC

4.8.2.1.5 ELD Event List for Annotations, Comments, and Driver Location Description

This chart must list all ELD event records that have an annotation, comment, or a manual entry of location description by the driver. Always review the comments, they may include reason for edits, and this is where driver's explain extraordinary circumstances like personal conveyance. If there is a comment it is because the ELD needed more information to support an event. Example if a driver is going into personal conveyance, it would be best practice to note the trailer was dropped and where before commencing personal conveyance.

Interpretation

The following definitions apply in the Hours of Service Regulation.

on-duty time means the period that begins when a driver begins work or is required by the motor carrier to be available to work, except if the driver is waiting to be assigned to work, and that ends when the driver stops work

or is relieved of responsibility by the motor carrier, and

(b) does not include driving time for the driver's personal use, if

(i) the vehicle is not used in the course of the business of the motor carrier,

(ii) the vehicle has been unloaded,

(iii) any trailers have been unhitched,

(iv) the distance travelled does not exceed 75 km in a day,

(v) the driver had recorded in the record of duty status the odometer reading at the beginning and at the end of the personal use, and

(vi) the driver is not the subject of an out-of-service declaration under section 91.

4.5.1.11 Event: Additional Hours Not Recorded

a) At each instance when an authorized user is entering additional hours that were not recorded during the current day or the required previous days specified in current Hours of Service regulations, as described in **4.3.2.2.4** (Option 2) of the Technical Standard, the ELD must record a new event.

b) The ELD must associate the record with the driver, the record originator, the vehicle, and the motor carrier, and must include the following data elements for each day during the current day and the required previous days specified in the current Hours of Service regulations:

(1) Event Sequence ID Number as described in 7.24

(2) Event Record Status as described in **7.23** anything with a 2, 3, or 4 needs additional review

(3) Event Record Origin as described in **7.22** anything with a 2, 3, or 4 needs additional review

(4) Event Type as described in **7.25** Print **Table 6** and **Table 9** for reference when reviewing RODS.

(5) Event Code as described in **7.20** Print **Table 6** and **Table 9** for reference when reviewing RODS.

(6) Event Date as described in 7.8

(7) Event Time as described in 7.40

(8) Date of the day as described in 7.8

(9) Beginning of work shift Time and End of work shift Time as described in 7.40

(10) Total Hours logged in off-duty

(11) Total Hours logged in on-duty and

(12) Comment /Annotation as described in **7.6** only certain events require a comment, if there is a comment its good practise to review it.

4.3.2.2.4 Indication of Situations Impacting duty-/driving-hour limitations

c) An ELD must provide the means to indicate additional hours that were not recorded for the current motor carrier during the current day, or the required previous days specified in the current Hours of Service regulations:

(1) When this function is selected, the ELD must prompt the user to select one of the following options:

i. Option 1: additional hours already recorded and reported in a RODS for another motor carrier.

ii. Option 2: additional hours not recorded since the driver was not required to keep a RODS immediately before the beginning of the day. (For example, in a 160 kms radius exemption or permit exemption.)

(2) When Option 1 is selected, the ELD must prompt the user to enter for the current day and the required previous days, the date, the time for beginning and end of each work shift period, and the total hours for each duty status.

(3) When Option 2 is selected, the ELD must prompt the user to enter for the current day and the required previous days, the date, the time for beginning and end of each work shift period, and total hours for on-duty and off-duty statuses.

(4) Upon confirmation of data entry as described under option 1 or 2 of this, the ELD must add those hours to the total hours already cumulated for each duty status and set the new duty-/driving-hour limitations.

(5) Upon confirmation of data entry as described under option 2 of this, the ELD must also record the driver's confirmation as an event and include data elements specified in **4.5.1.11** of the Technical Standard.

Exception regarding the recording of data elements in the event records generated by the ELD. This would be a app on a phone or no connection to the ECM.

4.5.1 b) If the driver is using a software application specified in **4.7.4** of the Technical Standard this or the ELD is implemented on a handheld unit that did not establish a link to the engine ECM as described in **4.2** of the Technical Standard, data elements from the vehicle engine ECM and the CMV Power Unit Number may be omitted in the records for the following event types and conditions:

(6) Additional Hours Not Recorded

4.5.1.6 Event: CMV's Engine Power Up and Shut Down Activity

a) When a CMV's engine is powered up or shut down, an ELD must record the event within 1 minute of occurrence.

b) The ELD must associate the record with the driver or the unidentified driver profile, the vehicle, and the motor carrier, and must include the following data elements:

(1) Event Sequence ID Number as described in 7.24

(2) Event Type as described **7.25** Print **Table 6** and **Table 9** for reference when reviewing RODS.

(3) Event Code as described in **7.20** Print **Table 6** and **Table 9** for reference when reviewing RODS.

(4) Event Date as described in 7.8

(5) Event Time as described in 7.40

(6) Total Vehicle Distance as described in **7.43** If there is no data this needs additional review

(7) Total Engine Hours as described in **7.19** If there is no data this needs additional review

(8) Event Latitude as described in 7.31

(9) Event Longitude as described in 7.33 and

(10) Distance Since Last Valid Coordinates as described in **7.9** if there is a 0 that is correct, if there is data or a 9, this needs additional review

SCHEDULE XVIII

(Sections 1 to 4)

Motor Vehicle Transport Act

Commercial Vehicle Driver's Hours of Service Regulations

77(2) (a) Failure to record information associated with record of duty status as required is \$500.00

(b) Failure to require driver to record information associated with record of duty status as required is \$1000.00

77(5) Failure to manually input or verify required information in ELD is \$500.00

77(6) (a) Use more than one ELD at same time is \$1000.00

(b) Request, require or allow driver to use more than one ELD at same time is \$2000.00

77(8) (a) Failure to record information related to record of duty status in complete and accurate manner is \$500.00

(b) Failure to ensure that driver records information related to record of duty status in complete and accurate manner is \$1000.00

Monitoring by Motor Carriers

Prior to the ELD mandate motor carriers were responsible for monitoring driver compliance with the Hours of Service regulations using paper logs. However, this monitoring was often more of a compliance formality, as logs were reviewed long after any violations had occurred. Coaching a driver would happen weeks to month after a violation occurred. Monitoring was a tedious process, with drivers having 20 days to submit their logs to the carrier for review.

With the introduction of ELDs, the monitoring process has changed and is more streamlined. RODS are accessible 24/7 through cloud storage, eliminating the need for carriers to wait to review the driver's records. Carriers must monitor the ELD dashboard and the available hours on a consistent basis to ensure compliance with the Regulations. Carriers must verify the accuracy of RODS daily and request edits if needed.

In this section, we will delve into the criteria of the compliance report and the essential information that must be included. By understanding these requirements and implementing appropriate monitoring measures, motor carriers can effectively ensure driver's compliance with the Regulations.

Verification of Records of Duty Status

78.3 (1) A motor carrier shall verify the accuracy of the certified records of duty status that are forwarded by the driver according to the supporting documents provided and shall require from the driver those changes necessary to ensure the accuracy of the records.

(2) The driver shall either accept or reject the changes required by the motor carrier, make the necessary changes and recertify the accuracy of their record of duty status and forward the amended records of duty status to the motor carrier.

Monitoring

87 (1) A motor carrier shall monitor the compliance of each driver with these Regulations.

(2) A motor carrier that determines that there has been non-compliance with these Regulations shall take immediate remedial action and record the dates on which the non-compliance occurred, and the action taken.

78.3 (1) This is worded in 2 parts:

1. Verify the accuracy of the certified RODS that are forwarded: RODS are required to be certified after the last entry of the day. The carrier is forwarded the certified RODS at the end of each day. It is the responsibility of the carrier to verify accuracy every day.

2. Require from the driver changes to ensure accuracy. These edits are required to be done daily or the data is permanent and cannot be amended.

78.3 (2) The driver is required to review the changes requested and work with the carrier going back and forth until both agree the RODS are accurate and compliant.

87 (1) is straightforward. The ELD is consistently monitoring the driver's time and checking the integrity of the ELD device and reporting this information back to the carrier using the carrier dashboard. The ELD device alerts the driver with an audible and visual warning 30 minutes before a duty status limit is reached and/or if there are device integrity, data integrity or connectivity issues.

87 (2) is really 3 parts.

1. Determine non-compliance – determination occurs immediately when a duty status limit is reached and the carrier and driver are notified via the ELD or the dashboard.

2. Immediate – as soon as the carrier and the driver are notified there is a violation. The ELD data provides a time stamp for the record.

3. Remedial action taken – This depends on the non-compliance. A driver going over a duty status limit should be immediately stopped and placed out of service.

A malfunction, the driver should stop and switch to paper logs and follow the malfunction protocol, a data diagnostic event should be noted and cleared if possible or the event may resolve itself after certain criteria is met. The ELD records these actions with time stamps and it is important to make clear notes to satisfy the criteria of recording the dates on which the non-compliance occurred, and the action taken.

Below is the current guidance for a monitoring policy. The ELD considerations for each point has been added where applicable.

The process used to monitor drivers for compliance must produce measurable results. The goal of the company is to work towards achieving a Fatigue Violation Rate of 0% (i.e., no fatigue-related violations by any drivers).

The company will adopt the following approach when reviewing driver records for hours of service violations:

• Assign a person to be responsible for monitoring, taking remedial action when violations are found, etc. *ELD: monitor dashboard daily, verify certified RODS as received. (RODS are required to be certified at the last entry of the day)*

• This person should also be responsible for ensuring they and other applicable employees have the necessary skills and knowledge to accurately analyze hours of service records.

• Verify that all authorized drivers have a record for every calendar day (including days off and holidays). *ELD: will not have missing records.*

• Check all authorized drivers for form and manner violations for every day. This includes checking for name, address, date, daily hour totals, and odometer readings on the record. *ELD: no longer necessary once the ELD is set up with company information. The ELD does not make form and manner errors such as spelling or abbreviations. The odometer and daily totals are calculated automatically.*

• Check all authorized drivers for fatigue-related violations: *ELD: driver is alerted* 30 minutes before a daily limit is reached. Driver is alerted to connectivity and

device integrity issues. There should never be a fatigue violation because the driver would stop driving when alerted to a daily limit being reached.

• Use independent supporting documents (that cannot be created or modified by the driver) to verify the accuracy of each driver's records. Supporting documents may include fuel receipts, bills of lading with shipping times, GPS records, or meal/hotel receipts, toll receipts, etc. *ELD: This is still required as the ELD does not understand intent. If a driver logs off duty for a on duty activity such as loading the ELD will not detect that violation.*

• Where an Electronic Onboard Recording Device (EOBR) is used in place of a hardcopy log, verify that the driver's on-duty and off-duty hours are accurate. For example, ensure that the EOBR has not recorded loading or unloading time as "off-duty" time. *ELD: Only certified ELD are to be used. The header will contain the ELD Authentication Value and ELD Identifier to confirm device certification.*

• When violations are identified in a driver's records, take appropriate remedial action. All action(s) taken must be documented in the driver's file and must include the date the violation was identified, and date issue was addressed.

• Prepare a monthly report of your findings and any corrective action(s) taken. Retain all reports for the current year and the preceding 4 years. The report should include a calculation of each driver's Fatigue Violation Rate (FVR) and of the company's overall FVR using the formula below:

FVR = Number of days with 1 or more fatigue-related violations x 100% Total number of days checked

• The report should also include a calculation of every driver's Form and Manner Violation Rate (FMVR) using the formula below:

FMVR = Number of days with 1 or more form and manner violations x 100% Total number of days checked

• It is recommended that carriers with one to ten drivers check every driver at least once a month for hours-of-service violations.

• Carriers with more than ten drivers should check at least ten drivers plus 10 per cent of the remaining drivers on a monthly basis. For example, a carrier with 30

drivers would check 10 drivers plus 10 per cent of the remaining 20 drivers, for a total of 12 drivers each month. In a larger company, every driver should be checked for hours-of-service compliance at least once annually. NOTE: A "driver" includes any person authorized to operate an NSC vehicle registered to the carrier. This includes full or part time employees, volunteers, mechanics, salespeople, dispatchers, office staff, owners, managers, supervisors, etc.

To satisfy the reporting regulation a carrier needs to prepare a monthly report of any findings and corrective action taken. Retain all reports for the current year and the preceding 4 years. The report should include a calculation of each driver's Fatigue Violation Rate (FVR) and of the company's overall FVR using the formula below:

FVR = Number of days with 1 or more fatigue-related violations x 100% Total number of days checked

• The report should also include a calculation of every driver's Form and Manner Violation Rate (FMVR) using the formula below:

FMVR = Number of days with 1 or more form and manner violations x 100% Total number of days checked.

ELD: Using the compliance reports generated by the ELD a daily, weekly, or monthly compliance report can be generated for every driver that has an account. The carrier should never have drivers with daily limit violations because the ELD is alerting the driver and the carrier is monitoring the driver using the dashboard. Use the reports and compare to two different records with known information to review for falsification. Hint: DVIR is not regulated in the Hours of Service, therefore DVIR is not in the Technical Standard. This means a DVIR can be used to monitor for hours of service and since the data is already in the same system, but it is a separate record, its less work for the administrator.

SCHEDULE XVIII

(Sections 1 to 4) Motor Vehicle Transport Act Commercial Vehicle Driver's Hours of Service Regulations

87(1) Failure to monitor driver's compliance with the Regulations is \$2000.00

87(2) Failure to take remedial action and record required information is \$2000.00

