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Technical Standard for Electronic Logging Devices

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Table of contents

1. SCOPE AND DESCRIPTION 1
1.1 ELD Function 1
1.2 System Users 1
1.3 System Architecture 1
1.4 System Design 1

2. ABBREVIATIONS 2

3. DEFINITIONS AND NOTATIONS 2
3.1 Definitions 2
3.1.1 Databus 2
3.1.2 ELD Event 2
3.1.3 Configuration of user account exempt from using an ELD 2
3.1.4 Geo-Location 3
3.1.5 Ignition Power Cycle, Ignition Power On Cycle, Ignition Power Off Cycle 3
3.1.6 Unidentified Driver 3
3.1.7 Day 3
3.1.8 Work shift 3
3.1.9 Archiving 3
3.1.10 Global Positioning Services 4
3.1.11 Cellular Communication Services 4
3.1.12 Satellite Communication Services 4
3.1.13 Driver notifications 4
3.1.14 Fully functional 5
3.2 Notations 5

4. FUNCTIONAL REQUIREMENTS 6
4.1 ELD User Accounts 6
4.1.1 Account Types 6
4.1.2 Account creation 6
4.1.3 Account Security 6
4.1.4 Account Management 6
4.1.5 Non-Authenticated Driving of a CMV 7
4.2 ELD-Vehicle Interface 7
4.3 ELD Inputs 7
4.3.1 ELD Sensing 7
4.3.1.1 Engine Power Status 7
4.3.1.2 Vehicle Motion Status 8
4.3.1.3 Vehicle Distance 8
4.3.1.4 Engine Hours 9
4.3.1.5 Date and Time 9

4.3.1.6 CMV Position 9
4.3.1.7 CMV VIN 9
4.3.2 Driver's Manual Entries 10
4.3.2.1 Driver's Entry of Required Event Data Elements 10
4.3.2.2 Driver's Status Inputs 10
4.3.2.2.1 Driver's Indication of Duty Status 10
4.3.2.2.2 Driver's Indication of Situations Impacting Driving Time Recording 11
4.3.2.2.3 Driver's Indication of Situations Impacting Off-Duty Time Requirements 12
4.3.2.2.4 Indication of Situations Impacting On-Duty-/Driving-hour limitations 13
4.3.2.3 Driver's Certification of RODS 15
4.3.2.4 Driver's Data Transfer Initiation Input 16
4.3.2.5 Driver's Entry of an Output File Comment 16
4.3.2.6 Driver's Annotation of RODS 16
4.3.2.7 Driver's Entry of Location Information 17
4.3.2.8 Driver's Record Entry/Edit 17
4.3.2.8.1 Mechanism for Driver Edits and Annotations 17
4.3.2.8.2 Driver Edit Limitations 18
4.3.3 Motor Carrier's Manual Entries 18
4.3.3.1 ELD Configuration 18
4.3.3.1.1 Configuration of Available Categories Impacting Driving Time Recording 18
4.3.3.1.2 Configuration of Using ELDs 19
4.3.3.1.3 Motor Carrier's Post-Review Electronic Edit Requests 19
4.4 ELD Processing and Calculations 20
4.4.1 Conditions for Automatic Setting of Duty Status 20
4.4.1.1 Automatic Setting of Duty Status to Driving 20
4.4.1.2 Automatic Setting of Duty Status to On-Duty not driving 20
4.4.1.3 Other Automatic Duty-Status Setting Actions Prohibited 20
4.4.1.4 Automatic Setting of Duty Status to Sleeper Berth during a Ferry Provision Period 21
4.4.2 Geo-Location Conversions 21
4.4.3 Date and Time Conversions 21
4.4.4 Setting of Event Parameters in Records, Edits, and Entries 22
4.4.4.1 Event Sequence Identifier (ID) number 22
4.4.4.2 Event Record Status, Event Record Origin, Event Type Setting 22
4.4.4.2.1 Records Automatically Recorded by ELD 22
4.4.4.2.2 Driver Edits 23
4.4.4.2.3 Driver Entries 23
4.4.4.2.4 Driver's Assumption of Unidentified Driver Logs 23
4.4.4.2.5 Motor Carrier Edit Suggestions 24
4.4.4.2.6 Driver's Actions Over Motor Carrier Edit Suggestions 24
4.4.4.2.7 Driver edits for driving time records reassigned between team drivers 24
4.4.4.2.8 Driver's actions over driving time records reassigned between team drivers 25
4.4.4.2.9 Driver edits for driving time records reassigned to the "Unidentified Driver" profile 25
4.4.4.3 Identification of co-drivers 26

4.4.5 Data Integrity Check Functions 27
4.4.5.1 Event Data Check 27
4.4.5.1.1 Event Checksum Calculation 27
4.4.5.1.2 Event Data Check Calculation 28
4.4.5.2 Line Data Check 28
4.4.5.2.1 Line Checksum Calculation 28
4.4.5.2.2 Line Data Check Calculation 28
4.4.5.2.3 Line Data Check Value Inclusion in Output File 28
4.4.5.3 File Data Check 28
4.4.5.3.1 File Checksum Calculation 29
4.4.5.3.2 File Data Check Value Calculation 29
4.4.5.3.3 File Data Check Value Inclusion in Output File 29
4.4.6 Hours of service Off-Duty time requirements and On-Duty-/Driving-hour limitations 29
4.5 ELD Recording 30
4.5.1 Events and Data to Record 30
4.5.1.1 Event: Change in Driver's Duty Status 31
4.5.1.2 Event: Intermediate Logs 31
4.5.1.3 Event: Change in Driver's Indication of Allowed Conditions that Impact Driving Time Recording 32
4.5.1.4 Event: Driver's Certification of Own RODS 32
4.5.1.5 Event: Driver's ELD Authentication Activity 33
4.5.1.6 Event: CMV's Engine Power Up and Shut Down Activity 33
4.5.1.7 Event: ELD Malfunction and Data Diagnostic Occurrence 33
4.5.1.8 Event: Off-Duty Time Deferral 34
4.5.1.9 Event: Change in Driver's Cycle 34
4.5.1.10 Event: Change in Operating Zone 35
4.5.1.11 Event: Additional Hours 35
4.5.1.12 Event: Change in Time Standard at Driver's Home Terminal 36
4.5.1.13 Event: Co-Driver Identification 36
4.6 ELD's Self-Monitoring of Required Functions 37
4.6.1 Compliance Self-Monitoring, Malfunction and Data Diagnostic Events 37
4.6.1.1 Power Compliance Monitoring 37
4.6.1.2 Engine Synchronization Compliance Monitoring 38
4.6.1.3 Timing Compliance Monitoring 39
4.6.1.4 Positioning Compliance Monitoring 39
4.6.1.5 Data Recording Compliance Monitoring 40
4.6.1.6 Monitoring Records Recorded under the Unidentified Driver Profile 40
4.6.1.7 Data Transfer Compliance Monitoring 41
4.6.1.8 Other Technology-Specific Operational Health Monitoring 41
4.6.2 ELD Malfunction Status Indicator 41
4.6.2.1 Visual Malfunction Indicator 41
4.6.3 ELD Data Diagnostic Status Indicator 42
4.6.3.1 Visual Data Diagnostic Indicator 42
4.6.4 Driver notifications for Off-Duty time requirements and On-Duty-/Driving-hour limitations 42

4.7 Special Purpose ELD Functions 43
4.7.1 Driver's ELD Volume Control 43
4.7.2 Driver's Access to Own ELD RODS 43
4.7.3 Privacy Preserving Provision for Use During Personal Uses of a CMV 43
4.7.4 ELD Events Recorded in a Software Application 44
4.8 ELD Outputs 44
4.8.1 Printout or Display 44
4.8.1.1 Printout Requirements 44
4.8.1.2 Display Requirements 45
4.8.1.3 Information to be Shown on the Printout and Display at Roadside 45
4.8.2 ELD Output File 52
4.8.2.1 ELD Output File Standard 52
4.8.2.1.1 Header Segment 52
4.8.2.1.2 User List 53
4.8.2.1.3 CMV List 53
4.8.2.1.4 ELD Event List for Driver's RODS 53
4.8.2.1.5 ELD Event List for Annotations and Driver's Location Description 54
4.8.2.1.6 ELD Event List for Driver's Certification of Own RODS 54
4.8.2.1.7 ELD Event List for Malfunction and Data Diagnostic 54
4.8.2.1.8 ELD Event List for ELD Authentication Activity 55
4.8.2.1.9 ELD Event List for CMV's Engine Power-Up and Shut Down Activity 55
4.8.2.1.10 ELD Event List for the Unidentified Driver Profile 55
4.8.2.1.11 [Reserved] 55
4.8.2.1.12 ELD Event List for Off-Duty Time Deferral 56
4.8.2.1.13 ELD Event List for Change in Driver's Cycle 56
4.8.2.1.14 ELD Event List for Change in Operating Zone 56
4.8.2.1.15 ELD Event List for Additional Hours 57
4.8.2.1.16 ELD Event List for Change in Time Standard at Driver's Home Terminal 57
4.8.2.1.17 ELD Event List for Change in Co-Driver Identification 57
4.8.2.1.18 File Data Check Value 58
4.8.2.2 ELD Output File Name Standard 58
4.9 Data Transfer Capability Requirements 58
4.9.1 Transfer of Electronic Files During Roadside Safety Inspections 59
4.9.2 Motor Carrier Data Reporting 59
4.10 Communications Standards for the Transmittal of Data Files from ELDs 60
4.10.1 Communications Standards for the Transmittal of Data Files from ELDs 60
4.10.1.1 [Reserved] 60
4.10.1.2 Wireless Data Transfer Through E-Mail 60
4.10.1.3 Data Transfer via USB 2.0 61
4.10.1.4 Data Transfer via Bluetooth® 61
4.10.2 Motor Carrier Data Transmission 61
4.11 Cellular and Satellite Communication Services 62

5. [RESERVED] 62

6. REFERENCES 63

7. DATA ELEMENTS DISCTIONARY 65
7.1 Day Starting Time 65
7.2 Carrier Name 65
7.3 [RESERVED] 65
7.4 CMV Power Unit Number 66
7.5 CMV VIN 66
7.6 Annotation 67
7.7 Data Diagnostic Event Indicator Status 67
7.8 Date 68
7.9 Distance Since Last Valid Coordinates 68
7.10 Driver's Licence Issuing Jurisdiction 69
7.11 Driver's Licence Number 69
7.12 Driver's Location Description 70
7.13 ELD Account Type 70
7.14 ELD Authentication Value 71
7.15 ELD Identifier 71
7.16 ELD Provider 72
7.17 ELD Certification Number 72
7.18 ELD Username 73
7.19 Engine Hours 73
7.20 Event Code 74
7.21 Event Data Check Value 74
7.22 Event Record Origin 75
7.23 Event Record Status 75
7.24 Event Sequence ID Number 76
7.25 Event Type 76
7.26 Exempt Driver Configuration 77
7.27 File Data Check Value 77
7.28 First Name 78
7.29 Geo-Location 78
7.30 Last Name 79
7.31 Latitude 79
7.32 Line Data Check Value 80
7.33 Longitude 80
7.34 Malfunction and Diagnostic Code 81
7.35 Malfunction Indicator Status 81
7.36 Cycle Used 82
7.37 Order Number 82
7.38 Output File Comment 83

7.39 [RESERVED] 83
7.40 Time 83
7.41 Time Zone Offset from UTC 84
7.42 Trailer Number(s) 84
7.43 Vehicle Distance 85
7.44 Off-Duty Time Deferral Status 85
7.45 Off-Duty Time Deferred 86
7.46 Operating Zone 86
7.47 [RESERVED] 86
7.48 Motor Carrier's Address 87
7.49 Hours in Work shift or Cycle 87
7.50 Total Hours 88

Schedule 1: RODS in PDF and printout format (Fall time change) I

Schedule 2: Tables V

List of Tables (Schedule 2)

Table 1 Duty Status Categories VI
Table 2 Categories for driver's indication of situations impacting driving time recording VI
Table 3 Character to decimal values mapping for checksum calculations VII
Table 4 Standard coding for required compliance Malfunction and Data diagnostic event detection VIII
Table 5 Abbreviation codes for provinces, territories, and states VIII
Table 6 "Event Type" Parameter Coding XI
Table 7 "Event Record Origin" Parameter Coding XII
Table 8 "Event Record Status" Parameter Coding XII
Table 9 "Event type" Parameter Coding XII
Table 10 Conventional compass rose direction coding to be used in the Geo-Location parameter XIII

Technical Standard for Electronic Logging Devices

1. SCOPE AND DESCRIPTION

This Standard specifies the minimal requirements for an electronic logging device (ELD) to be compliant with the specifications set out in this Standard.

1.1 ELD Function

The ELD discussed in this 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 specified in this 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 drivers' 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.

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 provision 3.1.2) with the required data elements specified in this Standard and retains data to support the performance requirements specified in this Standard.

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

e) This 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.

2. ABBREVIATIONS

CAN	Control Area Network
CCMTA	Canadian Council of Motor Transport Administrators
CMV	Commercial Motor Vehicle
CMVSS	Canadian Motor Vehicle Safety Standards
CSV	Comma-Separated Values
ECM	Electronic Control Module
ELD	Electronic Logging Device
HOS	Hours of Service
S/MIME	Secure/Multipurpose Internet Mail Extensions
RODS	Records of Duty Status
SMTP	Simple Mail Transfer Protocol
UTC	Coordinated Universal Time
UTF-8	Unicode Transformation Format – 8-bit encoding
USB	Universal Serial Bus
VIN	Vehicle Identification Number
XOR	Exclusive Or (bitwise binary operation)

3. DEFINITIONS AND NOTATIONS

3.1 Definitions

3.1.1 Databus

A vehicle databus refers to an internal communications network that interconnects components inside a vehicle and facilitates exchange of data between subsystems typically using serial or CAN protocols.

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 this Standard. The distinct ELD events relate to the driver's duty status and the ELD's operational integrity. They are either triggered by input from the driver (e.g., driver's duty status changes, driver's ELD authentication activity, etc.) or triggered by the ELD's internal monitoring functions (e.g., ELD malfunction detection, data diagnostic detection, intermediate logs, etc.). ELD events and required data elements for each type of ELD event are described in detail in provision 4.5.1.

3.1.3 Configuration of user account exempt from using an ELD

As specified in provision 4.3.3.1.2, 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 current HOS regulations (i.e. specified in regulation 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 diagnostic errors.

3.1.4 Geo-Location

Geo-location is the conversion of a position measurement in latitude/longitude coordinates into a description of the distance and direction to the name of the nearest city, town, village, municipality or the location on a highway or in a legal subdivision. Geo-location information is reported on an ELD's display, printouts, and output documents in PDF format.

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 powered off.

d) For purposes of ELD compliance throughout this Standard, a CMV's engine is "powered" when the engine is receiving power and the engine's power status is on, which can also be when the ignition key position is on and the CMV's engine is not running (engine speed is zero RPM). A CMV's engine is "powered off" or "shut down" when the engine is not receiving power and the engine's power status is off.

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 this 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 provision 4.1.5, until the motor carrier and the driver review the records and they are assigned to the true and correct owner.

3.1.7 Day

"Day" in respect of a RODS refers to the definition specified in the current HOS regulations.

3.1.8 Work shift

The "Work shift" refers to the elapsed time period described in provision 13(3) of the current HOS regulations.

3.1.9 Archiving

"Archiving" refers to the transfer of driver's ELD RODS, in chronological order, to a remote record storage system that is not implemented in the ELD system architecture specified in provision 1.3.

3.1.10 Global Positioning Services

"Global Positioning Services" refers to a satellite-based navigation system providing location and time-related information to the ELD, and including latitude, longitude, speed, and direction of travel.

3.1.11 Cellular Communication Services

"Cellular Communication Services" refers to any wireless communication technology implemented in the ELD, and using cellular networks for voice, data and video transmission over long distances. The ELD can implement these communication services in the system architecture specified in provision 1.3 and use them for the data transfer process required by some ELD functions (e.g., email transfer of driver's RODS, driver authentication, transmission of ELD configuration settings and requests for corrective edits to driver's RODS, etc.).

3.1.12 Satellite Communication Services

"Satellite Communication Services" refers to any wireless communication technology implemented in the ELD, and using satellites for voice, data and video transmission over long distances. Satellite Communication Services are not including Global Positioning Services specified in provision 3.1.10. The ELD can implement these communication services in the system architecture specified in provision 1.3 and use them for the data transfer process required by some ELD functions (e.g., email transfer of driver's RODS, driver authentication, transmission of ELD configuration settings and requests for corrective edits to driver's RODS, etc.).

3.1.13 Driver notifications

"Driver notifications" refers to a short and clear message for the authenticated driver. Functional specifications and requirements set out in this Standard require the ELD to notify the driver for different instances that require driver's attention (e.g., before reaching a On-Duty-/Driving-hour limitation prescribed in current HOS regulations, when cellular or satellite communication services are not available, etc.). These driver notifications:

a) Do not require immediate input or confirmation from the driver;
b) Do not require any information entry by the driver;
c) Require driver's confirmation, which is a single-step action performed when the driver is able to;
d) Remain visible and continuously communicated to the driver, until driver's confirmation;
e) Do not prevent the driver from using the ELD or any other application implemented in the ELD;
f) May also provide a brief audible signal to the driver; and
g) When the vehicle is in motion, driver notifications :
    (1) Are visible when the driver is seated in the normal driving position;
    (2) Can be read without any driver input or interaction with the ELD;
    (3) Prevent or minimize driver distractions; and
    (4) Are non-obstructive to primary driving tasks (i.e., not covering critical information or distracting via continuous sound or flashing).

3.1.14 Fully functional

"Fully functional" refers to an ELD with all required components and system architecture used in implementing ELD functionalities, compliant with all specifications and requirements set out in this Standard and monitoring its compliance with these requirements, and being ready to automatically record and store ELD events with all required data elements, even without a driver currently authenticated in the ELD.

3.2 Notations

Throughout this Standard the following notations are used when data elements are referenced.

a) < . > indicates a parameter an ELD must track. For example, <ELD Username> refers to the unique ELD username or identifier specified during the creation of an ELD account with the requirements set forth in provision 7.18.

b) { . } indicates which of multiple values of a parameter is being referenced. For example, <ELD Username {for the co-driver}> refers to the ELD username for the co-driver.

c) <CR> indicates a carriage return or new line or end of the current line. This notation is used in provisions 4.8.2.1.1 to 4.8.2.1.18, which describes the standard ELD output data file.

4. FUNCTIONAL REQUIREMENTS

4.1 ELD User Accounts

4.1.1 Account Types

An ELD must support a user account structure that separates drivers and motor carriers' support personnel (i.e. non-drivers).

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 licence number – excluding any separation character (e.g., hyphen), and the jurisdiction that issued the driver's licence 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 licence 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 non-authenticated driving of a CMV. This 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 shall separately record and retain 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 with the same ELD system architecture specified in provisions 1.3 and 4.7.4, the most recent ELD the driver is using shall retrieve, retain and produce a complete ELD RODS for that driver, on demand, for the current day and all the days specified in subsection 84(a) of the current HOS regulations.

d) For purposes of ELD compliance to this provision, there is no requirement for interoperability between ELD providers or different ELD system architectures.

e) An ELD is allowed to prevent concurrent user authentication into multiple ELD units for all ELD user accounts within a motor carrier's operation. For purposes of ELD compliance to this paragraph, ELD unit means any user interface providing a secure access to ELD data and implemented in the ELD system architecture specified in provisions 1.3 and 4.7.4.

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 provision 4.4.1; and

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

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 vehicle distance value, and total 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 engine ECM when the CMV's engine is powered on and must receive automatically the engine's power status, vehicle's motion status, total vehicle distance value and total engine hours value through the serial or CAN communication protocols supported by the engine ECM or the vehicle's databus. If the CMV does not have an engine ECM or any required data element cannot be captured from the engine ECM or the vehicle's databus, an ELD must use alternative sources to obtain or estimate these vehicle parameters with the listed accuracy requirements under provision 4.3.1.

c) For purposes of ELD compliance to this provision, an ELD can be used without being integrally synchronized with the engine of the CMV during any of the following periods:

   (1) The ELD is used when the CMV's engine is powered off;

   (2) The ELD is implemented on a handheld device and cannot establish a link to the engine when the ELD is away from the CMV;

   (3) The driver is using a software application specified in provision 4.7.4.

4.3 ELD Inputs

4.3.1 ELD Sensing

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 provision must not be configurable to greater than 8 km/h.
   (4) For purposes of ELD compliance to this provision, if the vehicle speed signal cannot fall and stay at 0 km/h for 3 consecutive seconds when the CMV is stationary, the stopped state speed threshold for this vehicle can be set to 4 km/h or less.

b) If an ELD is required to have a link to the vehicle's engine ECM and vehicle speed information can be acquired from the engine ECM or the vehicle's databus as specified in provision 4.2, vehicle speed information must be acquired from the engine ECM or the vehicle's databus.

c) If the CMV does not have an engine ECM or the vehicle speed information cannot be acquired from the engine ECM or the vehicle's databus as specified in provision 4.2, vehicle speed information must be acquired using an independent source apart from any global positioning services 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). An ELD must also monitor cumulative distance driven for each driver (including any co-driver and the unidentified driver profile) while driving each vehicle throughout the day (driven 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 or the vehicle's databus as specified in provision 4.2:
   (1) The ELD must monitor the odometer message broadcast on the engine ECM or the vehicle's databus 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.
   (3) The ELD must use the odometer message to determine driven vehicle distance throughout the day.

c) If the CMV does not have an engine ECM or the vehicle distance information cannot be acquired from the engine ECM or the vehicle's databus as specified in provision 4.2, the accumulated vehicle distance and driven 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 for each driver, the cumulative distance driven for personal use throughout the day.

e) Accumulated vehicle distance and driven 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 for each CMV driven by the driver. As specified in provision 4.8.1.3, such value must be reported for each driver (including any authenticated co-driver) as the "End Odometer" of the current day, and the "Start Odometer" of the next day.

g) An ELD must monitor for each driver, the cumulative distance driven for each ferry provision period.

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 or the vehicle's databus as specified in provision 4.2, the ELD must monitor the total engine hours message broadcast on the engine ECM or the vehicle's databus 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 or the vehicle's databus as specified in provision 4.2, engine hours must be obtained or estimated from a source that monitors the ignition power status 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 of this provision.

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 shall 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 provision 4.5.1.

4.3.1.7 CMV VIN

The vehicle identification number (VIN) for the power unit of a CMV must be automatically obtained and recorded if it is available on the engine ECM or the vehicle's databus.

4.3.2 Driver's Manual Entries

a) An ELD must prompt the driver to input information into the ELD only when the CMV is stationary and the driver's duty status is not set to "Driving", except for the conditions specified in provisions 4.1.5 (b), 4.4.1.2 (a) and 4.4.1.4 (a).

b) If the driver's duty status is set to "Driving", an ELD must only allow the driver who is driving the CMV to change the driver's duty status to another duty status.

c) A stopped vehicle must maintain zero (0) km/h speed to be considered stationary for purposes of information entry into an ELD. For purposes of ELD compliance to this provision, if the vehicle speed signal cannot fall and stay at 0 km/h for 3 consecutive seconds when the CMV is stationary, the vehicle can be considered stationary when the vehicle speed signal stays below the stopped state speed threshold set for this vehicle.

d) An ELD must allow an authenticated co-driver who is not currently identified in the driving role, but who has been authenticated into the ELD prior to the vehicle being in motion, to make entries over their own RODS when the vehicle is in motion. The ELD must allow co-drivers to switch driving roles only when the vehicle is stationary.

4.3.2.1 Driver's Entry of Required Event Data Elements

a) An ELD must provide a means for a driver to enter and modify any of the following data elements required at the time of recording ELD events or generating driver's ELD RODS and ELD output file:
   (1) <CMV Power Unit Number> as described in provision 7.4;
   (2) <CMV VIN> as described in provision 7.5;
   (3) <Trailer Number(s)> as described in provision 7.42;
   (4) <{Home Terminal} Address> as described in provision 7.48.

b) If these data elements are populated automatically, the ELD must provide means for the driver to review such information and make corrections as necessary.

c) For purposes of ELD compliance to this provision, these data elements must be entered, populated or updated by the driver before recording ELD events or generating driver's ELD RODS and ELD output file. Otherwise, edits to ELD event record(s) are subject to the requirements specified in provisions 4.3.2.8.1 and 4.3.2.8.2.

4.3.2.2 Driver's Status Inputs

4.3.2.2.1 Driver's Indication of Duty Status

a) An ELD must provide a means for the authenticated driver to select a driver's duty status.

b) The ELD must use the ELD duty status categories listed in Table 1.

4.3.2.2.2 Driver's Indication of Situations Impacting Driving Time Recording

a) An ELD must provide the means for a driver to indicate the beginning and end of a period when the driver may use the CMV for resting under the ferry provision, authorized personal use or performing yard moves. The ELD must acquire this status in a standard format from the category list in Table 2. This list must be supported independent of the duty status categories described in provision 4.3.2.2.1.

b) An ELD must allow a driver to select only categories from Table 2 that a motor carrier enables by configuration for that driver, as described in provision 4.3.3.1.1.

c) An ELD must only allow one category from Table 2 to be selected at any given time and use the latest selection by the driver.

d) The ELD must prompt the driver to enter an annotation upon selection of a category from Table 2 and record the driver's entry.

e) If the ELD or CMV's engine goes through a power off cycle (ELD or CMV's engine is powered off and then on) during a period when the driver has indicated the use of the CMV for resting under the ferry provision, authorized personal use or yard moves, the ELD must require confirmation of continuation of the condition by the driver. If not confirmed by the driver and the vehicle is in motion, the ELD must default to the category "none".

f) If the cumulative distance driven for personal use throughout the day exceeds the maximum distance allowed under current HOS regulations, the ELD must not allow the driver to indicate the beginning of a period for authorized personal use.

g) If the ELD has not established a link to the vehicle's engine as described in provision 4.2 (c), the ELD must not allow the driver to indicate the beginning or end of a period when the driver may use the CMV for resting under the ferry provision, authorized personal use or performing yard moves.

h) During a period when the driver indicates the use of the CMV for performing yard moves, the ELD must allow the driver to select any event type not listed in Table 1.

i) If the driver authenticates out of the ELD during a period when the driver has indicated the use of the CMV for resting under the ferry provision, authorized personal use or yard moves, the ELD must default to the category "none".

4.3.2.2.3 Driver's Indication of Situations Impacting Off-Duty Time Requirements

a) An ELD must provide the means for a driver to indicate deferral of daily Off-Duty time to the following day:
   (1) This function must be available only if the driver is not splitting Off-Duty time for the current day.
   (2) When this function is selected, the ELD must prompt the driver to review and confirm the Off-Duty time to be deferred.
   (3) The Off-Duty time deferred must not exceed the maximum time allowed under current HOS regulations.
   (4) Upon driver confirmation, the ELD must defer the Off-Duty time to the following day and set the <Off-Duty Time Deferral Status> to "Day 1" for the current day.
   (5) The ELD must record the driver's confirmation as an event, and include data elements specified in provision 4.5.1.8.
   (6) Upon driver confirmation, the ELD must also set the new Off-Duty time requirements for the current day, as per prescribed requirements in current HOS regulations.

b) When Off-Duty time has been deferred during the previous day:
   (1) The ELD must clearly indicate the Off-Duty time deferred for that driver during the previous day.
   (2) The ELD must prompt the driver to review and confirm the new Off-Duty time requirements for the current day.
   (3) Upon driver confirmation, the ELD must set the <Off-Duty Time Deferral Status> to "Day 2" for the current day.
   (4) The ELD must record the driver's confirmation as an event, and include data elements specified in provision 4.5.1.8.
   (5) Upon driver confirmation, the ELD must set the new Off-Duty time requirements for the current day, as per prescribed requirements in current HOS regulations.

c) When Off-Duty time has been deferred during the previous Day 1 and Day 2
   (1) The ELD must automatically set the <Off-Duty Time Deferral Status> to "none" for the current day.
   (2) The ELD must record a new event and include data elements specified in provision 4.5.1.8.
   (3) The ELD must set the new Off-Duty time requirements for the current day, as per prescribed requirements in current HOS regulations.

d) If the driver has indicated a period when the driver may use the CMV for resting under the ferry provision, the ferry provision status must remain until any of the following conditions are met:
   (1) A driver's indication of the ferry 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 is powered off and then on), as specified in provision 4.3.2.2.2 (e);
   (3) The ELD has reset to "none" after the driver authenticated out of the ELD, as specified in provision 4.3.2.2.2 (i); or
   (4) The cumulative distance driven during the ferry provision period exceeds the maximum distance allowed under the ferry provision of the current HOS regulations.

4.3.2.2.3 Driver's Indication of Situations Impacting Off-Duty Time Requirements

e) When aggregated sleeper berth time cumulated during a ferry provision period reaches the requirements of the ferry provision, the ELD must calculate the Off-Duty time requirements and On-Duty-/Driving-hour limitations as if the sleeper period was a continuous period, as per prescribed requirements in current HOS regulations.

4.3.2.2.4 Indication of Situations Impacting On-Duty-/Driving-hour limitations

a) An ELD must provide the means to indicate a cycle change:
   (1) This function must be available only if the Off-Duty time requirements specified in the current HOS regulations are met.
   (2) When this function is selected, the ELD must prompt the driver to review and confirm the new cycle (cycle 1 or cycle 2), new Off-Duty time requirements and On-Duty-/Driving-hour limitations.
   (3) Upon driver confirmation, the ELD must set the new <Cycle Used> and reset the <{Total} Hours in cycle> and <{Remaining} Hours in cycle> for the new cycle that began at the end of the required Off-Duty time period.
   (4) The ELD must record the driver's confirmation as an event, and include data elements specified in provision 4.5.1.9.

b) An ELD must provide the means to indicate an operating zone change:
   (1) When this function is selected, the ELD must prompt the driver to confirm the new operating zone, Off-Duty time requirements and On-Duty-/Driving-hour limitations for the day, work shift, cycle and operating zone.
   (2) Upon driver confirmation, the ELD must set the new <Operating Zone>, the Off-Duty time requirements and On-Duty-/Driving-hour limitations prescribed in current HOS regulations.
   (3) The ELD must also record the driver's confirmation as an event, and include data elements specified in provision 4.5.1.10.

4.3.2.2.4 Indication of Situations Impacting On-Duty-/Driving-hour limitations (cont'd)

c) An ELD must provide means for the driver to indicate additional hours that were not recorded in the ELD system architecture for the current motor carrier during the current day or the days specified in subsection 84(a) of the current HOS regulations:

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

i. Option 1: additional hours were already recorded in an ELD implemented in a different ELD system architecture, a different ELD provider or a different motor carrier.

ii. Option 2: additional hours were not recorded in an ELD since the driver was not required to keep a RODS immediately before the beginning of the day.

(2) When Option 1 is selected, the ELD must prompt the driver to enter the following information for the current day or any day specified in subsection 84(a) of the current HOS regulations:

i. For the current day: the event time and duty status selected for each change in driver's duty status (event type 1).

ii. For any previous day: the date and total On-Duty time for that day.

(3) When Option 2 is selected, the ELD must prompt the driver to enter for each day specified in subsection 84(a) of the current HOS regulations, the date, total On-Duty time for that day, and if applicable, the time for the beginning and end of the work shift.

(4) Upon completion of data entry for option 1 described in this provision:

i. For the current day, the ELD must record the driver's confirmation as an event for each change in driver's duty status, set each <Event Record Origin> to "5" (Additional hours recorded for another motor carrier or ELD system) and include data elements (items 1-7, 15 and 17) specified in provision 4.5.1.1. For purposes of ELD compliance to this provision, data elements (items 8-14 and 16) and the <CVM Power Unit Number> must be left blank for each event record.

ii. For any previous day, the ELD must also provide means for the driver to review such information and make corrections as necessary.

(5) Upon completion of data entry for Option 2 described in this provision:

i. For each day the driver was not required to keep a RODS, the ELD must use the On-Duty time indicated by the driver to calculate the corresponding Off-Duty time for that day, record the driver's confirmation as an event, and include data elements specified in provision 4.5.1.11.

ii. For purposes of ELD compliance to this provision, data elements for the beginning and end of the work shift must be left blank for each event record without On-Duty time for the day.

(6) Upon completion of data entry as described in this provision, the ELD must add these additional hours to the ELD calculations specified in provision 4.4.6.

d) An ELD must provide the means to indicate a change to the Day Starting Time:

(1) This function must be available only if the minimum Off-Duty time requirements specified in the current HOS regulations are met.

(2) When this function is selected, the ELD must prompt the driver to review and confirm the new day starting time.

(3) Upon driver confirmation, the ELD must set the new <Day Starting Time>, the Off-Duty time requirements and On-Duty-/Driving-hour limitations prescribed in current HOS regulations.

4.3.2.2.4 Indication of Situations Impacting On-Duty-/Driving-hour limitations (cont'd)

e) An ELD must provide the means to indicate a change to the time standard in effect at driver's home terminal:
   (1) When this function is selected, the ELD must prompt the driver to review and confirm the new time standard in effect at driver's home terminal.
   (2) Upon driver confirmation, the ELD must set the new <Time Zone Offset from UTC> as specified in provision 7.41, the new Off-Duty time requirements and On-Duty-/Driving-hour limitations prescribed in current HOS regulations.
   (3) The ELD must also record the driver's confirmation as an event, and include data elements specified in provision 4.5.1.12.

4.3.2.3 Driver's Certification of RODS

a) An ELD must include a function whereby a driver can certify the driver's 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's 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 re-certification by the driver, the ELD must indicate the required driver action on the ELD's display and prompt the driver to take the necessary action.

4.3.2.4 Driver's Data Transfer Initiation Input

a) An ELD must provide a standardized single-step driver interface for compilation of driver's ELD RODS and initiation of the data transfer to authorized safety officials when requested during a roadside inspection.

b) The ELD must input the data transfer request from the driver, require confirmation, present and request selection of the supported data transfer options by the ELD, and prompt for entry of the ELD output file comment as specified in provision 4.3.2.5. Upon confirmation, the ELD must generate the compliant ELD output file as specified in provision 4.8.2 and perform the data transfer.

c) The supported single-step data transfer initiation mechanism (such as a switch or an icon on a touch-screen display) must be clearly marked and visible to the driver when the vehicle is stopped.

d) If the data transfer option selected by the driver is the email, the ELD must prompt the driver to confirm or enter the recipient's email address.

e) In addition to the requirements specified in this provision, the following steps are required if the ELD can complete the data transfer process without establishing a link to the vehicle's engine, as described in provision 4.2 (c). Upon receiving the data transfer request from the driver when the ELD has not established a link to the vehicle's engine:

   (1) The ELD must notify the driver that it did not establish a link to the vehicle's engine and cannot capture required data elements for the vehicle's engine activity.

   (2) The ELD must prompt the driver to select one of the following options:

      i. Option 1: cancel the data transfer request; or

      ii. Option 2: acknowledge and confirm to proceed with the data transfer process, even if the ELD will generate and transfer an ELD output file that will not include all required data elements.

   (3) Upon confirmation of Option 2 as described in this provision, the following data elements specified in provisions 4.8.1.3 (b) and 4.8.2.1.1 may be left blank in the ELD output file if they are not available or cannot accurately be determined:

      i. <{Current} {Total} Vehicle Distance> as described in provision 7.43; and

      ii. <{Current} {Total} Engine Hours> as described in provision 7.19.

4.3.2.5 Driver's Entry of an Output File Comment

An ELD must accommodate the entry of an output file comment up to 60 characters long. If an authorized safety official provides a key phrase or code during an inspection to be included in the output file comment, it must be entered and embedded in the ELD RODS in the exchanged dataset as specified in provision 4.8.2. The default value for the output file comment must be blank. This output file comment must be used only for the creation of the related ELD output file for the intended time, place, and ELD user.

4.3.2.6 Driver's Annotation of RODS

a) An ELD must allow a driver to add annotations in text format to recorded, entered, or edited ELD events.

b) The ELD must require annotations to be 4 characters or longer, including embedded spaces if driver annotation is required and driver is prompted by the ELD.

4.3.2.7 Driver's Entry of Location Information

a) An ELD must allow manual entry of a CMV's location by the driver in text format in support of the driver edit requirements described in provision 4.3.2.8.

b) The driver's manual location entry must be available as an option to a driver only when prompted by the ELD under allowed conditions as described in provisions 4.6.1.4 and 4.7.4.

c) A manual location entry must report the character "M" for <Latitude> and <Longitude> data elements in ELD RODS.

4.3.2.8 Driver's Record Entry/Edit

a) An ELD must provide a mechanism for a driver to review, edit, and annotate the driver's ELD RODS when a notation of errors or omissions is necessary or allow for the input of the driver's missing ELD record(s) subject to the requirements specified in provisions 4.3.2.8.1 and 4.3.2.8.2.

b) An ELD must not permit alteration or erasure of the original information collected concerning the driver's ELD RODS or alteration of the source data streams used to provide that information.

4.3.2.8.1 Mechanism for Driver Edits and Annotations

a) If a driver edits or annotates an ELD record or enters missing information, the act must not overwrite the original record.

b) The ELD must use the process outlined in provision 4.4.4.2 to configure required event attributes to track the edit history of records.

c) Driver edits must be accompanied by an annotation. The ELD must prompt the driver to annotate edits.

4.3.2.8.2 Driver Edit Limitations

a) An ELD must not allow or require the editing or manual entry of records with the following event types, as described in provision 7.25:
   (1) An intermediate log (event type 2);
   (2) A driver's ELD authentication activity (event type 5);
   (3) CMV's engine power up/shut down (event type 6);
   (4) ELD malfunction and data diagnostic events (event type 7); or
   (5) Co-Driver Identification (event type 25).

b) An ELD must not allow automatically recorded driving time to be shortened.

c) An ELD must not allow the ELD username associated with an ELD record to be edited and reassigned, except under the following circumstances:
   (1) Assignment of Unidentified Driver records: ELD events recorded under the "Unidentified Driver" profile may be edited only for the purpose of reassignment to the driver associated with the records.
   (2) Correction of errors with team drivers: In the case of team drivers, the driver account associated with the driving time records may be edited and reassigned between the team drivers if there was a mistake resulting in a mismatch between the actual driver and the driver recorded by the ELD and if both team drivers were respectively indicated in each other's RODS as a co-driver. The ELD must require each co-driver to confirm the change for the corrective action to take effect.
   (3) Correction of errors for a driving record that was originally recorded under the "Unidentified Driver" profile and assumed by the driver: The driver account associated with the driving time records may be edited only for the purpose of reassignment to the unique "Unidentified Driver account".

4.3.3 Motor Carrier's Manual Entries

An ELD must restrict availability of motor carrier entries outlined in this provision only to authenticated "support personnel" account holders.

4.3.3.1 ELD Configuration

If an ELD or a technology that includes an ELD function offers configuration options to the motor carrier or the driver that are not otherwise addressed or prohibited in this Standard, the configuration options must not affect the ELD's compliance with the requirements of this Standard for each configuration setting of the ELD.

4.3.3.1.1 Configuration of Available Categories Impacting Driving Time Recording

a) An ELD must allow a motor carrier to unilaterally configure the availability of each of the four categories listed on Table 2 that the motor carrier chooses to authorize for each of its drivers. By default, the category "none" must be set for a new driver account.

b) A motor carrier may change the configuration for the availability of the Ferry Provision (FY), Authorized Personal Use of CMV (PC) and/or Yard Moves (YM) categories for each of its drivers. Changes to the configuration setting must be recorded by the ELD and communicated to the authenticated driver.

4.3.3.1.2 Configuration of Using ELDs

a) An ELD must provide the motor carrier the ability to configure a driver account exempt from use of an ELD.

b) The ELD must default the setting of this configuration option for each new driver account created on an ELD to “no exemption”.

c) An exemption must be proactively configured for an applicable driver account by the motor carrier. The ELD must prompt the motor carrier to annotate the record and provide an explanation for the configuration of exemption.

d) If a motor carrier configures a driver account as exempt:

   (1) The ELD must present the configured indication that is in effect for that driver during the ELD authentication processes.

   (2) The ELD must continue to record ELD driving time but suspend detection of missing data elements data diagnostic events for the driver described in provision 4.6.1.5 and data transfer compliance monitoring function described in provision 4.6.1.7 when such driver is authenticated on the ELD.

4.3.3.1.3 Motor Carrier’s Post-Review Electronic Edit Requests

a) An ELD may allow the motor carrier (via a monitoring algorithm or support personnel) to screen, review, and request corrective edits to the driver’s certified (as described in provision 4.3.2.3) and submitted RODS through the ELD system in electronic format specified in provision 4.8.2.1. If this function is implemented by the ELD, the ELD must also support functions for the driver to see and review the requested edits. For purposes of ELD compliance to this provision, the term “edits” is referring to the editing or manual entry of event records suggested over driver’s ELD RODS.

b) Edits requested by anyone or any system other than the driver must require the driver’s electronic confirmation or rejection.

c) Edits requested by anyone or any system other than the driver are also subject to requirements specified in provision 4.3.2.8.2.

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 the 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 is powered off and then on), as specified in provision 4.3.2.2.2 (e);
   (3) The cumulative distance driven for personal use throughout the day exceeds the maximum distance allowed under the personal use provision of the current HOS regulations; or
   (4) The ELD has reset to "none" after the driver authenticated out of the ELD, as specified in provision 4.3.2.2.2 (i).

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 is powered off and then on), as specified in provision 4.3.2.2.2 (e);
   (3) The CMV exceeds a speed of 32 km/h; or
   (4) The ELD has reset to "none" after the driver authenticated out of the ELD, as specified in provision 4.3.2.2.2 (i).

c) For purposes of ELD compliance to this provision for team drivers, the term "driver" refers only to the co-driver currently identified in the driving role, as specified in provision 4.4.4.3.

4.4.1.2 Automatic Setting of Duty Status to On-Duty not driving

a) When the duty status is set to "Driving" and the CMV has not been in-motion for 5 consecutive minutes, the ELD must prompt the driver to confirm continued driving status or enter the proper duty status. If the driver does not respond to the ELD prompt within 1-minute after receiving the prompt, the ELD must automatically switch the duty status to "On-Duty not driving". The time thresholds for purposes of this provision must not be configurable.

b) When the duty status is set to "Driving" and the CMV is stationary, the ELD must automatically switch the duty status to "On-Duty not driving" when the engine is powered off.

c) For purposes of ELD compliance to this provision for team drivers, the term "driver" refers only to the co-driver currently identified in the driving role, as specified in provision 4.4.4.3.

4.4.1.3 Other Automatic Duty-Status Setting Actions Prohibited

An ELD must not feature any other automatic RODS setting mechanism than those described in provisions 4.4.1.1, 4.4.1.2 and 4.4.1.4. Duty status changes that are not initiated by the driver, including duty status alteration recommendations by motor carrier support personnel or a software algorithm, are subject to motor carrier edit requirements specified in provision 4.3.3.1.3.

4.4.1.4 Automatic Setting of Duty Status to Sleeper Berth during a Ferry Provision Period

a) If the driver has indicated a period when the driver may use the CMV for resting under the ferry provision, when the duty status is set to "Driving" and the CMV has not been in-motion for 5 consecutive minutes, the ELD must prompt the driver to confirm continued driving status or enter the proper duty status. If the driver does not respond to the ELD prompt within 1-minute after receiving the prompt, the ELD must automatically switch the duty status to "Sleeper berth". The time thresholds for purposes of this provision must not be configurable.
b) If the driver has indicated a period when the driver may use the CMV for resting under the ferry provision, when the duty status is set to "Driving" and the CMV is stationary, the ELD must automatically switch the duty status to "Sleeper berth" when the engine is powered off.
c) For purposes of ELD compliance to this provision for team drivers, the term "driver" refers only to the co-driver currently identified in the driving role, as specified in provision 4.4.4.3.

4.4.2 Geo-Location Conversions

a) For each event and each driver's RODS including vehicle position information as specified in provision 4.8.1.3, the ELD must convert automatically captured vehicle position in latitude/longitude coordinates into geo-location information, indicating approximate distance and direction to the name of the nearest city, town, village, municipality or the location on a highway or in a legal subdivision, and abbreviation of the province, territory or state.
b) Geo-location information for all Canadian jurisdictions must be derived from a database that contains all locations (cities, towns, villages, municipalities, etc.) listed in the latest Canadian Geo-Location database available on the CCMTA website and referenced in provision 6.
c) An ELD's viewable outputs (such as printouts or display) must feature geo-location information as place names in text format.
d) Geo-location conversion for purposes of ELD compliance to this provision means the conversion of the latitude/longitude coordinates without using cellular or satellite communication services at any time.

4.4.3 Date and Time Conversions

a) An ELD shall 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 provision 7.41.
b) An ELD must record the driver's RODS using the time standard in effect at the driver's 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 provision 4.5.1.4.
d) For purposes of ELD compliance to this provision, when the ELD records a change to the time standard in effect at driver's home terminal as specified in provision 4.5.1.12, the new parameter <Time Zone Offset from UTC> for date and time conversion must be accounted for only for new ELD event records and annotations including event date and time information subsequent to that change.
e) When the ELD username associated with an ELD event record is edited and reassigned under allowed conditions as described in provision 4.3.2.8.2 (c), the ELD must also convert the date and time captured in UTC standard to the time standard in effect at driver's home terminal.

4.4.4 Setting of Event Parameters in Records, Edits, and Entries

This provision describes the security measures for configuring and tracking event attributes for ELD records, edits, and entries in a standardized manner.

4.4.4.1 Event Sequence Identifier (ID) number

a) Each ELD event must feature an <Event Sequence ID Number>.
   (1) The <Event Sequence ID Number> for each ELD event must use continuous numbering across all users of that ELD and across engine and ELD power on and off cycles.
   (2) An ELD must use the next available <Event Sequence ID Number> (incremented by one) each time a new event is recorded.
   (3) The <Event Sequence ID Number> must track at least the last 65 536 unique events recorded on the ELD.

b) The continuous event sequence ID numbering structure used by the ELD must be mapped into a continuous hexadecimal number between “0000” (Decimal 0) and “FFFF” (Decimal 65535).

c) For purposes of ELD compliance to this provision, the <Event Sequence ID Number> must be generated and assigned to each ELD event at the instance of the event record being created.

4.4.4.2 Event Record Status, Event Record Origin, Event Type Setting

a) An ELD must retain the original records even when allowed edits and entries are made over a driver’s ELD RODS.

b) An ELD must keep track of all event record history, and the process used by the ELD must produce the parameters <Event Record Origin>, <Event Record Status>, and <Event Type> for the ELD RODS in the standard codes specified in provisions 7.22, 7.23 and 7.25, respectively for each record as a standard security measure.

c) In addition to the process specified in provision 4.4.4.2 (b), the event record history must also include the date, time and originator for all annotations associated to edits or entries made over a driver’s ELD RODS.

4.4.4.2.1 Records Automatically Recorded by ELD

At the instance, an ELD creates a record automatically, the ELD must:

a) Set the <Event Record Status> to “1” (active); and

b) Set the <Event Record Origin> to “1” (automatically recorded by ELD).

4.4.4.2.2 Driver Edits

At the instance of a driver editing existing record(s), the ELD must:

a) Identify the ELD record(s) being modified for which the <Event Record Status> is currently set to "1" (active);

b) Acquire driver input for the intended edit and construct the ELD record(s) that will replace the record(s) identified in provision 4.4.4.2.2(a);

c) Set the <Event Record Status> of the ELD record(s) identified in provision 4.4.4.2.2(a), which is being modified, to "2" (inactive - changed);

d) Set the <Event Record Status> of the ELD record(s) constructed in provision 4.4.4.2.2(b) to "1" (active); and

e) Set the <Event Record Origin> of the ELD record(s) constructed in provision 4.4.4.2.2(b) to "2" (edited or entered by the driver).

4.4.4.2.3 Driver Entries

When a driver enters missing record(s), the ELD must:

a) Acquire driver input for the missing entries being implemented and construct the new ELD record(s) that will represent the driver entries;

b) Set the <Event Record Status> of the ELD record(s) constructed in provision 4.4.4.2.3(a) to "1" (active); and

c) Set the <Event Record Origin> of the ELD record(s) constructed in provision 4.4.4.2.3(a) to "2" (edited or entered by the driver).

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 data elements of the unidentified driver record(s) from provision 4.4.4.2.4(a) and acquire driver input to populate missing data 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 provision 4.4.4.2.4(a), which is being modified, to "2" (inactive – changed);

d) Set the <Event Record Status> of the ELD record(s) constructed in provision 4.4.4.2.4(b) to "1" (active); and

e) Set the <Event Record Origin> of the ELD record(s) constructed in provision 4.4.4.2.4(b) to "4" (assumed from unidentified driver profile).

4.4.4.2.5 Motor Carrier Edit Suggestions

If a motor carrier requests an edit for the editing or manual entry of event records to a driver's RODS electronically, the ELD must:

a) Identify the ELD record(s) the motor carrier requests to be modified for which the <Event Record Status> is currently set to "1" (active);

b) Acquire motor carrier input for the intended edit and construct the ELD record(s) that will be added or replace the record(s) identified in provision 4.4.4.2.5(a) — if approved by the driver;

c) Set the <Event Record Status> of the ELD record(s) in provision 4.4.4.2.5(b) to "3" (inactive – change requested); and

d) Set the <Event Record Origin> of the ELD record constructed in provision 4.4.4.2.5(b) to "3" (edit requested by an authenticated user other than the driver).

4.4.4.2.6 Driver's Actions Over Motor Carrier Edit Suggestions

a) If edits are requested by the motor carrier, the ELD must allow the driver to review the requested edits and indicate on the ELD whether the driver confirms or rejects the requested edit(s).

b) If the driver approves the motor carrier's edit suggestion the ELD must:

   (1) Set the <Event Record Status> of the ELD record(s) identified under provision 4.4.4.2.5 (a) being modified, to "2" (inactive – changed); and

   (2) Set the <Event Record Status> of the ELD record(s) constructed in provision 4.4.4.2.5 (b) to "1" (active).

c) If the driver disapproves the motor carrier's edit(s) suggestion, the ELD must set the <Event Record Status> of the ELD record(s) identified in provision 4.4.4.2.5 (b) to "4" (inactive – change rejected).

4.4.4.2.7 Driver edits for driving time records reassigned between team drivers

When ELD driving time record(s) are edited and reassigned between team drivers under allowed conditions as described in provision 4.3.2.8.2 (c) (2), the ELD must:

a) Identify the ELD driving time record(s) that will be edited and reassigned between team drivers and for which the <Event Record Status> is currently set to "1" (active);

b) Use data elements of the driving time record(s) from provision 4.4.4.2.7 (a) and acquire driver input to reassign the record(s) to the driver account identified in the driver's RODS as a co-driver for that period, and construct the ELD record(s) that will replace the record(s) identified in provision 4.4.4.2.7 (a) — if approved by the co-driver;

c) Set the <Event Record Status> of the ELD record(s) constructed in provision 4.4.4.2.7 (b) to "3" (inactive – change requested); and

d) Set the <Event Record Origin> of the ELD record(s) constructed in provision 4.4.4.2.7 (b) to "3" (edit requested by an authenticated user other than the driver).

4.4.4.2.8 Driver's actions over driving time records reassigned between team drivers

When ELD driving time record(s) are edited and reassigned between team drivers under allowed conditions as described in provision 4.3.2.8.2 (c) (2), the ELD must:

a) Allow each co-driver to review the requested edit(s) and indicate on the ELD whether the driver confirms or rejects the requested edit(s).

b) When the requested edit(s) are approved by both co-drivers, the ELD must:

   (1) Set the <Event Record Status> of the ELD record(s) identified under provisions 4.4.4.2.5 (a) or 4.4.4.2.7 (a) to "2" (inactive – changed); and

   (2) Set the <Event Record Status> of the ELD record(s) constructed in provisions 4.4.4.2.5 (b) or 4.4.4.2.7 (b) to "1" (active).

c) If the driver disapproves the requested edit(s), the ELD must set the <Event Record Status> of the ELD record(s) identified in provisions 4.4.4.2.5 (b) or 4.4.4.2.7 (b) to "4" (inactive – change rejected).

d) For purposes of ELD compliance to this provision, edit(s) requested by a driver are deemed approved by that driver.

4.4.4.2.9 Driver edits for driving time records reassigned to the "Unidentified Driver" profile

When ELD driving time record(s) are edited and reassigned to the unique "Unidentified Driver" profile under allowed conditions as described in provision 4.3.2.8.2 (c) (3), the ELD must:

a) Identify the ELD driving time record(s) that will be edited and reassigned to the "Unidentified Driver" and for which the <Event Record Status> is currently set to "1" (active);

b) Use data elements of the driving time record(s) from provision 4.4.4.2.9 (a) and acquire driver input to reassign the record(s) to the "Unidentified Driver" account, and construct the ELD record(s) that will replace the record(s) identified in provision 4.4.4.2.9 (a);

c) Set the <Event Record Status> of the ELD record(s) identified in provision 4.4.4.2.9 (a), which is being modified, to "2" (inactive – changed);

d) Set the <Event Record Status> of the ELD record(s) constructed in provision 4.4.4.2.9 (b) to "1" (active); and

e) Set the <Event Record Origin> of the ELD record(s) constructed in provision 4.4.4.2.9 (b) to "2" (edited or entered by the driver).

4.4.4.3 Identification of co-drivers

An ELD must provide the means to identify team drivers, including at least one of the options specified in paragraph (a) or (b) hereafter :

a) Option 1: If the means are implemented for co-drivers authenticated in the same ELD unit:
   (1) When an additional driver is authenticating in the ELD, the ELD must prompt the driver to confirm its authentication as a co-driver and identify which co-driver must be currently identified in the driving role.
   (2) Upon driver confirmation, the ELD must:
      i. Identify the selected co-driver profile in the driving role and identify all team drivers in each other's RODS as a co-driver.
      ii. Set the new Splitting of daily Off-Duty time requirements for each driver, as per prescribed requirements in current HOS regulations.
      iii. Notify each driver to be currently identified as a co-driver and subject to the Splitting of daily Off-Duty time requirements for team drivers.
      iv. Record the driver's confirmation as an event for each driver and include data elements specified in provision 4.5.1.13.
   (3) When a driver is not concurrently authenticated in the ELD, the ELD must no longer identify the corresponding driver as a co-driver.

b) Option 2: If the means are implemented for co-drivers not authenticated in the same ELD unit:
   (1) When drivers are authenticated in an ELD being integrally synchronized, as specified in provision 4.2, with the engine of the same CMV, the ELD must prompt the driver to confirm its identification as a co-driver and identify which co-driver must be currently identified in the driving role.
   (2) Upon driver confirmation, the ELD must:
      i. Identify the selected co-driver profile in the driving role and identify all team drivers in each other's RODS as a co-driver.
      ii. Set the new Splitting of daily Off-Duty time requirements for each driver, as per prescribed requirements in current HOS regulations.
      iii. Notify each driver to be currently identified as a co-driver and subject to the Splitting of daily Off-Duty time requirements for team drivers.
      iv. Record the driver's confirmation as an event for each driver and include data elements specified in provision 4.5.1.13.
   (3) When a driver is not concurrently authenticated in the ELD or an ELD unit is not integrally synchronized with the engine of the same CMV, the ELD must no longer identify the corresponding driver as a co-driver.

c) When a driver is no longer identified as a co-driver, the ELD must:
   (1) Set the new Splitting of daily Off-Duty time requirements for each driver, as per prescribed requirements in current HOS regulations.
   (2) Notify each driver to be no longer identified as a co-driver and subject to the Splitting of daily Off-Duty time requirements for a single driver.
   (3) Clear the co-driver identification event for each driver and include data elements specified in provision 4.5.1.13.

d) The ELD must not feature any other mechanism to identify team drivers in each other's RODS as a co-driver.

4.4.5 Data Integrity Check Functions

a) An ELD must support standard security measures that require the calculation and recording of standard data check values for each ELD event recorded, for each line of the output data file specified in provision 4.8.2.1 (b), and for each output data file to be generated for transmission to an authorized safety official or the motor carrier.

b) For purposes of implementing data check calculations, the alphanumeric-to-numeric mapping provided in Table 3 must be used.

c) Each ELD event record type specified in provisions 4.5.1.1 through 4.5.1.3 must include an <Event Data Check Value>, which must be calculated as specified in provision 4.4.5.1. An <Event Data Check Value> be calculated at the time of the following instances and must accompany that event record thereafter:
   (1) When an event record is automatically created by the ELD;
   (2) When an authorized edit is performed by the driver on the ELD;
   (3) When an electronic edit proposal is created by the motor carrier through the ELD system.

d) Each line of the output data file must include a <Line Data Check Value>, which must be calculated as specified in provision 4.4.5.2.

e) Each output data file must also include a <File Data Check Value>, which must be calculated as specified in provision 4.4.5.3.

4.4.5.1 Event Data Check

The <Event Data Check Value> must be calculated as specified in provisions 4.4.5.1.1 and 4.4.5.1.2.

4.4.5.1.1 Event Checksum Calculation

a) A checksum calculation includes the summation of numeric values or mappings of a specified group of alphanumeric data elements. The ELD must calculate an event checksum value associated with each ELD event at the instance of the event record being created.

b) The event record data elements that must be included in the checksum calculation are the following:
   (1) <Event Type> as described in provision 7.25;
   (2) <Event Code> as described in provision 7.20;
   (3) <{Event} Date> as described in provision 7.8;
   (4) <{Event} Time> as described in provision 7.40;
   (5) <{Accumulated} Vehicle Distance> as described in provision 7.43;
   (6) <{Elapsed} Engine Hours> as described in provision 7.19;
   (7) <{Event} Latitude> as described in provision 7.31;
   (8) <{Event} Longitude> as described in provision 7.33;
   (9) <CMV Power Unit Number> as described in provision 7.4; and
   (10) <ELD Username> as described in provision 7.18.

c) The ELD must sum the numeric values of all individual characters making up the listed data elements using the character to decimal value coding specified in Table 3, and use the 8-bit lower byte of the hexadecimal representation of the summed total as the event checksum value for that event.

4.4.5.1.2 Event Data Check Calculation

The <Event Data Check Value> must be the hexadecimal representation of the output 8-bit byte, after the below bitwise operations are performed on the binary representation of the event checksum value, as set forth below:

a) Three consecutive circular shift left (rotate no carry -left) operations; and
b) A bitwise XOR operation with the hexadecimal value C3 (decimal 195; binary 11000011).

4.4.5.2 Line Data Check

A <Line Data Check Value> must be calculated at the time of the generation of the ELD output file, to transfer data to authorized safety officials or to archive drivers' ELD records at a motor carrier's facility. A <Line Data Check Value> must be calculated as specified in provisions 4.4.5.2.1 to 4.4.5.2.3.

4.4.5.2.1 Line Checksum Calculation

a) The ELD must calculate a line checksum value associated with each line of the output data file specified in provision 4.8.2.1 (b), at the instance when an ELD output file is generated.
b) The data elements that must be included in the line checksum calculation vary as per the output data file specified in provision 4.8.2.1 (b).
c) The ELD must convert each character featured in a line of output using the character to decimal value coding specified on Table 3 and sum the converted numeric values of each character listed on a given ELD output line item (excluding the <Line Data Check Value> being calculated), and use the 8-bit lower byte value of the hexadecimal representation of the summed total as the line checksum value for that line of output.

4.4.5.2.2 Line Data Check Calculation

The <Line Data Check Value> must be calculated by performing the following operations on the binary representation of the line checksum value as follows:

a) Three consecutive circular shift left (rotate no carry -left) operations on the line checksum value; and
b) A bitwise XOR operation with the hexadecimal value 96 (decimal 150; binary 10010110).

4.4.5.2.3 Line Data Check Value Inclusion in Output File

The calculated <Line Data Check Value> must be appended as the last line item of each of the individual line items of the output data file specified in provision 4.8.2.1 (b).

4.4.5.3 File Data Check

A <File Data Check Value> must also be calculated at the time of the creation of an ELD output file. A <File Data Check Value> must be calculated as specified in provisions 4.4.5.3.1 to 4.4.5.3.3.

4.4.5.3.1 File Checksum Calculation

a) The ELD must calculate a single 16-bit file checksum value associated with an ELD output file at the instance when an ELD output file is generated.

b) The <File Data Check Value> calculation must include all individual <Line Data Check Value> contained in that file.

c) The ELD must sum all individual <Line Data Check Value> contained in a data file output created, and use the lower two 8-bit byte values of the hexadecimal representation of the summed total as the "file checksum" value.

4.4.5.3.2 File Data Check Value Calculation

a) The <File Data Check Value> must be calculated by performing the following operations on the binary representation of the file checksum value:

(1) Three consecutive circular shift left (commonly called rotate no carry-left) operations on each 8-bit bytes of the value; and

(2) A bitwise XOR operation with the hexadecimal value 969C (decimal 38556; binary 1001011010011100).

b) The <File Data Check Value> must be the 16-bit output obtained from the above process.

4.4.5.3.3 File Data Check Value Inclusion in Output File

The calculated 16-bit <File Data Check Value> must be converted to hexadecimal 8-bit bytes and must be appended as the last line item of the output data file specified in provision 4.8.2.1 (b).

4.4.6 Hours of service Off-Duty time requirements and On-Duty-/Driving-hour limitations

a) An ELD must track total hours recorded for each driver, each duty status and for the operating zone, day, work shift and cycle being used. For purposes of ELD compliance to this provision, total hours must be accounted for only for ELD event records with an <Event Record Status> currently set to "1" (active).

b) An ELD must automatically set the Off-Duty time requirements and On-Duty-/Driving-hour limitations for the operating zone, day, work shift and cycle being used, as per prescribed requirements and limitations in the current HOS regulations.

c) [Reserved]

d) When allowed edits or entries over ELD RODS are made or approved by the driver, all ELD event records with an <Event Record Status> currently set to "1" (active) must be accounted for to notify the driver prior to reaching any Off-Duty time requirement or On-Duty-/Driving-hour limitation prescribed in the current HOS regulations.

4.5 ELD Recording

4.5.1 Events and Data to Record

a) An ELD must record data for all distinct events specified in provisions 4.5.1.1 to 4.5.1.13.

b) If the driver is recording a new event when the ELD has not established a link to the vehicle's engine as described in provision 4.2 (c), data elements for the vehicle's engine activity and the <CMV Power Unit Number> may be omitted in the records for the following event types and conditions:

(1) A driver's ELD authentication activity (event type 5);

(2) A change in Driver's duty status (event type 1), only if the event is triggered by the driver and is not automatically recorded by the ELD, as specified in provisions 4.4.1.1, 4.4.1.2 and 4.4.1.4.

(3) Driver's certification/re-certification of RODS (event type 4);

(4) Off-Duty Time Deferral (event type 20);

(5) Change in Driver's Cycle (event type 21);

(6) Additional Hours (event type 23); and

(7) Change in Time Standard at Driver's Home Terminal (event type 24).

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

(1) <{Total} Vehicle Distance> and <{Accumulated} Vehicle Distance> as described in provision 7.43;

(2) <{Total} Engine Hours> and <{Elapsed} Engine Hours> as described in provision 7.19;

(3) <CMV Power Unit Number> associated with the record, as described in provision 7.4; and

(4) <CMV VIN> as described in provision 7.5.

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 provision 4.5.1 (c) that are omitted in the event records, the ELD must not permit alteration of the original information recorded, as specified in provision 4.3.2.8.

4.5.1.1 Event: Change in Driver's Duty Status

a) When a driver's duty status changes, the ELD must record a new event.

b) The ELD must associate the record with the driver or the unidentified driver profile (when no driver is authenticated at the time of recording), the record originator—if created during an edit or entry—the vehicle and the motor carrier, and must include the following data elements:

(1) <Event Sequence ID Number> as described in provision 7.24;

(2) <Event Record Status> as described in provision 7.23;

(3) <Event Record Origin> as described in provision 7.22;

(4) <Event Type> as described in provision 7.25;

(5) <Event Code> as described in provision 7.20;

(6) <{Event} Date> as described in provision 7.8;

(7) <{Event} Time> as described in provision 7.40;

(8) <{Accumulated} Vehicle Distance> as described in provision 7.43;

(9) <{Elapsed} Engine Hours> as described in provision 7.19;

(10) <{Event} Latitude> as described in provision 7.31;

(11) <{Event} Longitude> as described in provision 7.33;

(12) <Distance Since Last Valid Coordinates> as described in provision 7.9;

(13) <Malfunction Indicator Status {for the ELD}> as described in provision 7.35;

(14) <Data Diagnostic Event Indicator Status {for the Driver}> as described in provision 7.7;

(15) <{Event} Annotation> as described in provision 7.6;

(16) <Driver's Location Description> as described in provision 7.12; and

(17) <Event Data Check Value> as described in provision 7.21.

4.5.1.2 Event: Intermediate Logs

a) When the driver's duty status is set to "Driving", and there has not been a duty status change event or another intermediate log event 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 (when no driver is authenticated at the time of recording), the vehicle, and the motor carrier, and must include the same data elements outlined in provision 4.5.1.1 (b), except for the <Driver's Location Description> (item 16).

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

a) At each instance when the status of a driver's indication of ferry provision, 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 the following data elements:

(1) <Event Sequence ID Number> as described in provision 7.24;

(2) <Event Record Status> as described in provision 7.23;

(3) <Event Record Origin> as described in provision 7.22;

(4) <Event Type> as described in provision 7.25;

(5) <Event Code> as described in provision 7.20;

(6) <{Event} Date> as described in provision 7.8;

(7) <{Event} Time> as described in provision 7.40;

(8) <{Accumulated} Vehicle Distance> as described in provision 7.43;

(9) <{Elapsed} Engine Hours> as described in provision 7.19;

(10) <{Event} Latitude> as described in provision 7.31;

(11) <{Event} Longitude> as described in provision 7.33;

(12) <Distance Since Last Valid Coordinates> as described in provision 7.9;

(13) <Malfunction Indicator Status {for the ELD}> as described in provision 7.35;

(14) <Data Diagnostic Event Indicator Status {for the Driver}> as described in provision 7.7;

(15) <{Event} Annotation> as described in provision 7.6;

(16) <Driver's Location Description> as described in provision 7.12;

(17) <{Total} Vehicle Distance> as described in provision 7.43; and

(18) <Event Data Check Value> as described in provision 7.21.

4.5.1.4 Event: Driver's Certification of Own RODS

a) At each instance when a driver certifies or re-certifies that the driver's 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 provision 7.24;

(2) <Event Type> as described in provision 7.25;

(3) <Event Code> as described in provision 7.20;

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

(5) <{Event} Date> and <Date {of the certified RODS}> as described in provision 7.8; and

(6) <{Event} Time> as described in provision 7.40.

4.5.1.5 Event: Driver's ELD Authentication 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 provision 7.24;
(2) <Event Type> as described in provision 7.25;
(3) <Event Code> as described in provision 7.20;
(4) <{Event} Date> as described in provision 7.8;
(5) <{Event} Time> as described in provision 7.40;
(6) <{Total} Vehicle Distance> as described in provision 7.43; and
(7) <{Total} Engine Hours> as described in provision 7.19.

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 each driver (including any authenticated co-driver) or the unidentified driver profile (when no driver is authenticated at the time of recording), the vehicle, and the motor carrier, and must include the following data elements:

(1) <Event Sequence ID Number> as described in provision 7.24;
(2) <Event Type> as described in provision 7.25;
(3) <Event Code> as described in provision 7.20;
(4) <{Event} Date> as described in provision 7.8;
(5) <{Event} Time> as described in provision 7.40;
(6) <{Total} Vehicle Distance> as described in provision 7.43;
(7) <{Total} Engine Hours> as described in provision 7.19;
(8) <{Event} Latitude> as described in provision 7.31;
(9) <{Event} Longitude> as described in provision 7.33; and
(10) <Distance Since Last Valid Coordinates> as described in provision 7.9.

4.5.1.7 Event: ELD Malfunction and Data Diagnostic Occurrence

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

b) The ELD must associate the record with each driver (including any authenticated co-driver) or the unidentified driver profile (when no driver is authenticated at the time of recording), the vehicle and the motor carrier, and must include the following data elements:

(1) <Event Sequence ID Number> as described in provision 7.24;
(2) <Event Type> as described in provision 7.25;
(3) <Event Code> as described in provision 7.20;
(4) <Malfunction or Diagnostic Code> as described in provision 7.34;
(5) <{Event} Date> as described in provision 7.8;
(6) <{Event} Time> as described in provision 7.40;
(7) <{Total} Vehicle Distance> as described in provision 7.43; and
(8) <{Total} Engine Hours> as described in provision 7.19.

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 provision 7.24;

(2) <Event Record Status> as described in provision 7.23;

(3) <Event Record Origin> as described in provision 7.22;

(4) <Event Type> as described in provision 7.25;

(5) <Event Code> as described in provision 7.20;

(6) <{Event} Date> as described in provision 7.8;

(7) <{Event} Time> as described in provision 7.40;

(8) <{Event} Annotation> as described in provision 7.6;

(9) <Off-Duty Time Deferral Status> as described in provision 7.44; and

(10) <Off-Duty Time Deferred> as described in provision 7.45.

4.5.1.9 Event: Change in Driver's Cycle

a) At each instance when the <Cycle Used> by the driver 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 provision 7.24;

(2) <Event Record Status> as described in provision 7.23;

(3) <Event Record Origin> as described in provision 7.22;

(4) <Event Type> as described in provision 7.25;

(5) <Event Code> as described in provision 7.20;

(6) <{Event} Date> as described in provision 7.8;

(7) <{Event} Time> as described in provision 7.40;

(8) <{Event} Annotation> as described in provision 7.6; and

(9) <{New} Cycle Used> as described in provision 7.36.

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 provision 7.24;
(2) <Event Record Status> as described in provision 7.23;
(3) <Event Record Origin> as described in provision 7.22;
(4) <Event Type> as described in provision 7.25;
(5) <Event Code> as described in provision 7.20;
(6) <{Event} Date> as described in provision 7.8;
(7) <{Event} Time> as described in provision 7.40;
(8) <{Event} Latitude> as described in provision 7.31;
(9) <{Event} Longitude> as described in provision 7.33;
(10) <Distance Since Last Valid Coordinates> as described in provision 7.9;
(11) <{Event} Annotation> as described in provision 7.6;
(12) <Driver's Location Description> as described in provision 7.12; and
(13) <{New} Operating Zone> as described in provision 7.46.

4.5.1.11 Event: Additional Hours

a) At each instance when the driver is indicating additional hours as described in provision 4.3.2.2.4 (c) (Option 2), the ELD must record a new event.

b) The ELD must associate the record with the driver and the motor carrier, and must include the following data elements for each day specified in subsection 84(a) of the current HOS regulations:

(1) <Event Sequence ID Number> as described in provision 7.24;
(2) <Event Record Status> as described in provision 7.23;
(3) <Event Record Origin> as described in provision 7.22;
(4) <Event Type> as described in provision 7.25;
(5) <Event Code> as described in provision 7.20;
(6) <{Event} Date> as described in provision 7.8;
(7) <{Event} Time> as described in provision 7.40;
(8) <Date {of the day}> as described in provision 7.8;
(9) <{Beginning of work shift} Time> as described in provision 7.40;
(10) <{End of work shift} Time> as described in provision 7.40;
(11) <Total Hours {logged in "Off-Duty"}> as described in provision 7.50;
(12) <Total Hours {logged in "On-Duty"}> as described in provision 7.50; and
(13) <{Event} Annotation> as described in provision 7.6.

4.5.1.12 Event: Change in Time Standard at Driver's Home Terminal

a) At each instance when the parameter <Time Zone Offset from UTC> specified in provision 7.41 is changed, the ELD must record a new event.

b) The ELD must associate the record with each driver (including any authenticated co-driver) or the unidentified driver profile (when no driver is authenticated at the time of recording), the record originator – if created during an edit or entry, the vehicle and the motor carrier, and must include the following data elements:

(1) <Event Sequence ID Number> as described in provision 7.24;
(2) <Event Record Status> as described in provision 7.23;
(3) <Event Record Origin> as described in provision 7.22;
(4) <Event Type> as described in provision 7.25;
(5) <Event Code> as described in provision 7.20;
(6) <{Event} Date> as described in provision 7.8;
(7) <{Event} Time> as described in provision 7.40;
(8) <{Event} Annotation> as described in provision 7.6; and
(9) <{New} Time Zone Offset from UTC> as described in provision 7.41.

4.5.1.13 Event: Co-Driver Identification

a) At each instance when the status of an ELD's identification of co-drivers is changed, the ELD must record the event.

b) The ELD must associate the record with each driver (including any authenticated co-driver), the vehicle and the motor carrier, and must include the following data elements:

1) <Event Sequence ID Number> as described in provision 7.24;
2) <Event Type> as described in provision 7.25;
3) <Event Code> as described in provision 7.20;
4) <{Event} Date> as described in provision 7.8;
5) <{Event} Time> as described in provision 7.40;
6) <ELD Username {for the co-driver}> as described in provision 7.18;
7) <First Name {for the co-driver}> as described in provision 7.28;
8) <Last Name {for the co-driver}> as described in provision 7.30;
9) <{Total} Vehicle Distance> as described in provision 7.43; and
10) <{Total} Engine Hours> as described in provision 7.19.

4.6 ELD's Self-Monitoring of Required Functions

An ELD shall monitor its compliance with the technical requirements of this provision for the detectable malfunctions and data inconsistencies listed in Table 4 and must keep records of its malfunction and data diagnostic event detection.

4.6.1 Compliance Self-Monitoring, Malfunction and Data Diagnostic Events

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 provisions 4.3.1.1 to 4.3.1.4, its onboard sensors, and data record history to identify instances when it may not have complied with the power requirements specified in provision 4.3.1.1, in which case, the ELD must set a power data diagnostic event for the corresponding driver(s).

b) An ELD must set a power compliance malfunction if the power data diagnostic event described in provision 4.6.1.1 (a) 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. For purposes of ELD compliance to this provision, a malfunction must be set only if the aggregated driving time understatement includes at least a new period beginning after the last power compliance malfunction event was cleared by the ELD.

c) A power data diagnostic event must be cleared by the ELD when the ELD meets the power requirements specified in provision 4.3.1.1.

d) A power compliance malfunction event must be cleared by the ELD when the ELD meets the power requirements specified in provision 4.3.1.1.

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 provisions 4.3.1.1 to 4.3.1.4, its onboard sensors, and data record history to identify instances and durations of its non-compliance with the ELD engine synchronization requirement specified in provision 4.2, in which case, the ELD must set an engine synchronization data diagnostic event for the corresponding driver(s).

b) An ELD required to establish a link to the engine ECM as described in provision 4.2 must monitor its connectivity to the engine ECM and its ability to retrieve the vehicle parameters described under provisions 4.3.1.1 to 4.3.1.4 and must set an engine synchronization data diagnostic event for the corresponding driver(s) when it no longer can acquire updated values for any ELD parameter 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 provisions 4.3.1.1 to 4.3.1.4 is lost for more than 30 minutes during a 24-hour period aggregated across all driver profiles, including the unidentified driver profile. For purposes of ELD compliance to this provision, a malfunction must be set only if the aggregated time includes at least a new period beginning after the last engine synchronization compliance malfunction event was cleared by the ELD.

d) If the ELD has not established a link to the vehicle's engine as described in provision 4.2 (c) :

   (1) The ELD must notify the driver that it cannot capture required data elements for the vehicle's engine activity and monitor the engine's power status and vehicle's motion status as specified in provisions 4.3.1.1 and 4.3.1.2.

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

   (3) The connectivity status with the vehicle's engine must be indicated to all drivers using 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 vehicle's engine connectivity status must be continuously communicated to the driver when the ELD is powered.

e) An engine synchronization data diagnostic event must be cleared by the ELD when the ELD meets the engine synchronization requirements specified in provision 4.2 and can acquire updated values for all ELD parameters required for records within 60 seconds of the need.

f) An engine synchronization compliance malfunction event must be cleared by the ELD when the ELD meets the engine synchronization requirements specified in provision 4.2 and can acquire updated values for all ELD parameters required for records within 60 seconds of the need.

4.6.1.3 Timing Compliance Monitoring

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

b) A timing compliance malfunction event must be cleared by the ELD when the ELD meets the timing compliance requirements specified in provision 4.3.1.5.

4.6.1.4 Positioning Compliance Monitoring

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

b) ELD records and driver's RODS 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 a positioning compliance malfunction. For purposes of ELD compliance to this provision, a malfunction must be set only if the elapsed time includes at least a new period beginning after the last positioning compliance malfunction event was cleared by the ELD.

d) If location information 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 the character "X" for <Latitude> and <Longitude> data elements, unless location is entered manually by the driver, in which case it must record the character "M" instead.

e) Under the circumstances listed in provision 4.6.1.4 (d), if the driver is recording any ELD event type listed hereafter, the ELD must prompt the driver to enter location information in accordance with provision 4.3.2.7. If the driver does not enter the location information and the vehicle is in motion, the ELD must set a missing required data element data diagnostic event for the corresponding driver.

   (1) A change in Driver's duty status (event type 1);

   (2) An indication (beginning or end) of using the ferry provision, personal use of CMV or yard moves (event type 3);

   (3) A change in operating zone (event type 20).

f) If location information must be recorded at an instance when the ELD has set a positioning compliance malfunction, the ELD must record the character "E" for <Latitude> and <Longitude> data elements, regardless of whether the driver is prompted and manually enters location information.

g) A positioning compliance malfunction event must be cleared by the ELD when the ELD meets the CMV position requirements specified in provision 4.3.1.6.

4.6.1.5 Data Recording Compliance Monitoring

a) An ELD must monitor its storage capacity and integrity and must set a data recording compliance malfunction if it can no longer record or retain required events or retrieve records that are not otherwise archived 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 set a missing data elements data diagnostic event for the corresponding driver(s) if any required data element is missing at the time of recording.

c) A data recording compliance malfunction event must be cleared by the ELD when the ELD meets the data recording requirements specified in provision 4.6.1.5 (a).

d) A data diagnostic event for missing data elements must be cleared by the ELD when there is no data element missing from any active event record reported in the driver's RODS for the current Day. For purposes of ELD compliance to this provision, an active event record refers to an ELD event record with an <Event Record Status> currently set to “1” (active).

e)

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’s records attributable to the driver under the authenticated driver’s profile as described in provision 4.3.2.8.2 (c)(1) 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 set 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 must be cleared by the ELD when driving time recorded under the unidentified driver profile for the current day and all the days specified in subsection 84(a) of the current HOS regulations drops to 15 minutes or less.

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 provision 4.9.1 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 set a data transfer data diagnostic event for the corresponding driver(s) and enter an unconfirmed data transfer mode.

c) After an ELD sets 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 set a data transfer compliance malfunction.

d) A data transfer data diagnostic event must be cleared by the ELD when the ELD can confirm proper in-service operation of the data transfer mechanism(s) implemented by the ELD.

e) A data transfer compliance malfunction event must be cleared by the ELD when the ELD can confirm proper in-service operation of the data transfer mechanism(s) implemented by the ELD.

4.6.1.8 Other Technology-Specific Operational Health Monitoring

In addition to the required monitoring schemes described in provisions 4.6.1.1 to 4.6.1.7, 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 provisions 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 ELD Malfunction Status Indicator

ELD malfunctions affect the integrity of the device and its compliance; therefore, active malfunctions must be indicated to all drivers using that ELD. An ELD must provide a recognizable visual indicator, and may provide an audible signal, to the driver as to its malfunction status.

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.

4.6.3 ELD Data Diagnostic Status Indicator

a) ELD data diagnostic status affects only the authenticated user; therefore, an ELD must only indicate the active data diagnostic status applicable to each driver (including any authenticated co-driver) authenticated into the ELD.

b) An ELD must provide a recognizable visual indicator, and may provide an audible signal, to the authenticated driver (including any authenticated co-driver) as to its data diagnostic status.

4.6.3.1 Visual Data Diagnostic Indicator

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

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

c) The data diagnostic indicator must be clearly illuminated when there is an active data diagnostic event related to the authenticated driver.

d) The data diagnostic status must be continuously communicated to the driver when the ELD is powered.

4.6.4 Driver notifications for Off-Duty time requirements and On-Duty-/Driving-hour limitations

a) If the driver has indicated authorized personal use of the CMV, the ELD must notify the driver when the cumulative distance driven for personal use throughout the day exceeds the maximum distance allowed under current HOS regulations.

b) An ELD shall notify the driver at least 30 minutes in advance of reaching any Off-Duty time requirement or On-Duty-/Driving-hour limitation prescribed in the current HOS regulations.

c) An ELD must also clearly indicate which requirement or limit the driver is about to reach for the day, work shift, cycle and operating zone being used.

d) If the driver has indicated using the ferry provision, the ELD must notify the driver when the cumulative distance driven during the ferry provision period exceeds the maximum distance allowed under current HOS regulations.

e) For purposes of ELD compliance to this provision, driver notifications must be immediately communicated to the driver when the driver's duty status is set to "Driving" or "On-Duty not driving", even if other software applications are implemented in the ELD.

f) The ELD must notify the driver when the parameter <Time Zone Offset from UTC> specified in provision 7.41 is automatically adjusted for Daylight Savings Time changes in effect at driver's home terminal.

4.7 Special Purpose ELD Functions

4.7.1 Driver's ELD Volume Control

a) If a driver selects the "Sleeper berth" duty status when no co-driver is currently identified in the driving role, and if the ELD outputs audible signals, the ELD must either:
   (1) Allow the driver to mute the ELD's volume or turn off the ELD's audible output, or
   (2) Automatically mute the ELD's volume or turn off the ELD's audible output.

b) For purposes of this provision, if an ELD operates in combination with another device or other hardware or software technology that is not separate from the ELD, the volume controls required herein apply to the combined device or technology.

4.7.2 Driver's Access to Own ELD RODS

a) An ELD must provide a mechanism for a driver to obtain a copy of the driver's own ELD RODS on demand, and must be either on a printout format as specified in provision 4.8.1.3 or in electronic format as specified in provision 4.8.2.1.

b) The process must not require a driver to go through the motor carrier to obtain copies of the driver's own ELD RODS if driver's RODS reside on or are accessible directly by the ELD unit used by the driver.

c) If an ELD meets the requirements of this provision by making output files available to the driver, it must also provide a utility function for the driver to display these output files on a computer.

d) When the ELD is producing ELD RODS as specified in this provision:
   (1) The following data elements specified in provision 4.8.1.3 (b) may be left blank if they are not available or cannot accurately be determined:
      i. <{Current} {Total} Vehicle Distance> as described in provision 7.43;
      ii. <{Current} {Total} Engine Hours> as described in provision 7.19; and
      iii. <{Current} Geo-location> as described in provision 7.29.
   (2) The following data elements specified in provision 4.8.1.3 (b) must be replaced with the character "X" if they are not available or cannot accurately be determined:
      i. <{Current} Latitude> and <{Current} Longitude> as described in provisions 7.31 and 7.33.

4.7.3 Privacy Preserving Provision for Use During Personal Uses of a CMV

a) During a period when a driver indicates authorized personal use of CMV, the ELD must:
   (1) Monitor the cumulative distance driven for personal use as specified in provision 4.3.1.3.
   (2) Prevent the driver from selecting any event type, except to indicate the end of authorized personal use described in provision 4.3.2.2.2.
   (3) Only record authorized personal use events, ELD malfunction and data diagnostic events, as specified in provisions 4.5.1.3 and 4.5.1.7.

b) A driver's indication that the CMV is being driven for authorized personal purposes may span more than one CMV ignition power on cycle if the driver proactively confirms continuation of the personal use condition prior to placing the vehicle in motion when the ELD prompts the driver at the beginning of the new ignition power on cycle.

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 provision 4.2 (c). Furthermore, such application may not include any sensing functionality described in provision 4.3.1, but it is compliant with the date and time requirements specified in provision 4.3.1.5.

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

c) When using this function, the ELD must allow the driver to select only among the following event types, as described in provision 7.25 :

(1) Change in driver's duty status – only "On-Duty not driving" or "Off-Duty" (event type 1);

(2) Driver's certification/re-certification of RODS (event type 4);

(3) Driver's ELD authentication activity (event type 5);

(4) Off-Duty time deferral (event type 20);

(5) Driver's cycle change (event type 21);

(6) Additional hours (event type 23); and

(7) Change in Time Standard at Driver's Home Terminal (event type 24).

d) The ELD must only allow one event type to be selected at any given time and use the latest selection by the driver.

e) When using this function and for each event type listed in provision 4.7.4 (c), the ELD must record the same data elements outlined in provision 4.5.1. However, a subset of the required data elements must be omitted in the records, as described in further detail below. When a driver selects a change in driver's duty status (event type 1), the ELD must:

(1) Record the character "X" for <Latitude> and <Longitude> data elements, unless location information is entered by the driver, in which case it must record the character "M" instead.

(2) Prompt the driver to enter the location information in accordance with provision 4.3.2.7.

(3) If the driver does not enter the location information, the ELD must record a missing required data element data diagnostic event for the driver.

4.8 ELD Outputs

4.8.1 Printout or Display

The ELD shall generate a compliant report as specified in this provision, either as a printout or on a display.

4.8.1.1 Printout Requirements

Printout shall accommodate the graph grid specifications as listed in provision 4.8.1.3.

4.8.1.2 Display Requirements

a) This provision does not apply if an ELD produces a printout for use at a roadside inspection.

b) An ELD must be designed so that its display may be reasonably viewed by an authorized safety official without entering the CMV. For example, the display may be untethered from its mount or connected in a manner that would allow it to be passed outside of the vehicle for a reasonable distance.

4.8.1.3 Information to be Shown on the Printout and Display at Roadside

a) The printout and display must show RODS for the inspected driver's profile and the unidentified driver profile separately. If there are no unidentified driver records existing on the ELD for the current day and for any of the days specified in subsection 84(a) of the current HOS regulations, an ELD does not need to print or display unidentified driver records for the authorized safety official. Otherwise, information for the inspected driver's profile and the unidentified driver profile must be printed or displayed and provided to the authorized safety official.

b) The printout and display must show the following information for the current day and all the days specified in subsection 84(a) of the current HOS regulations: (Items in <. > are data elements described in provisions 7.1 to 7.50)

   (1) Date: <Date {of RODS}>

   (2) Day Starting Time, Time Zone Offset from UTC: <Day Starting Time>, <Time Zone Offset from UTC>

   (3) Start Odometer: <{Beginning of the Day for the driver} {Total} Vehicle Distance {for each CMV driven by the driver}>

   (4) End Odometer: <{End of the Day for the driver} {Total} Vehicle Distance {for each CMV driven by the driver}>

   (5) Carrier: <Carrier Name {for the carrier}>

   (6) Home Terminal Address, Principal Place of Business Address: <{Home terminal} Address {for the carrier}>, <{Principal place of Business} Address {for the carrier}>

   (7) Driver Name: <{Driver} Last Name>, <{Driver} First Name>

   (8) Driver ID: < ELD Username {for the driver}>

   (9) Driver Licence Jurisdiction: <{Driver} Driver's Licence Issuing Jurisdiction>

   (10) Driver Licence Number: <{Driver} Driver's Licence Number>

   (11) Co-Driver Name: <{Co-Driver's} Last Name {for each driver currently identified as a co-driver}>, <{Co-Driver's} First Name {for each driver currently identified as a co-driver}>

   (12) Co-Driver ID: <ELD Username {for each driver currently identified as a co-driver}>

   (13) Cycle: <Cycle Used {for the driver}>

   (14) Operating zone: <Operating Zone>

   (15) Total hours in work shift: <{Driver's} {Total} Hours in Work shift {for the most recent Work shift}>

   (16) Total hours in cycle: <{Driver's} {Total} Hours in Cycle {logged in "On-Duty not driving" and "Driving" statuses}>

   (17) Remaining hours in cycle: <{Driver's} {Remaining} Hours in Cycle>

   (18) Distance Today: <{Driven} Vehicle Distance {accumulated for each CMV}>

   (19) Current Total Distance: <{Current} {Total} Vehicle Distance>

   (20) Current Engine Hours: <{Current} {Total} Engine Hours>

   (21) ELD Provider: <ELD Provider>

   (22) ELD ID: <ELD Identifier {for each ELD used by the Driver}>

4.8.1.3 Information to be Shown on the Printout and Display at Roadside (cont'd)

(23) [Reserved]

(24) ELD Certification: <ELD Certification Number {for each ELD used by the Driver}>

(25) Truck Tractor ID: <CMV Power Unit Number {for each CMV driven by the Driver}>

(26) Truck Tractor VIN: <CMV VIN {for each CMV driven by the Driver}>

(27) Trailer ID: <Trailer Number(s) {for each trailer}>

(28) Current Location: <{Current} Geo-location>, <{Current} Latitude>, <{Current} Longitude>

(29) Unidentified Driving Records: <Data Diagnostic Event Indicator Status {for "Unidentified driving records data diagnostic" event for the ELD used by the driver}>

(30) Exempt Driver Status: <Exempt Driver Configuration {for the Driver}>

(31) Off-Duty Time Deferral: <Off-Duty Time Deferral Status {Description} {for the Driver}>

(32) Time Deferred: <Off-Duty Time Deferred {for the Driver}>

(33) ELD Malfunction Status: <Malfunction Indicator Status {for the ELD used by the driver}> and <Malfunction or Diagnostic Code {for each active Malfunction for the ELD used by the driver}>

(34) Driver's Data Diagnostic Status: <Data Diagnostic Event Indicator Status {for the Driver}> and <Malfunction or Diagnostic Code {for each active Data Diagnostic for the Driver}>

(35) Current Date and Time: <{Current} Date {of Printout or Display}>, <{Current} Time {of Printout or Display}>

(36) Comment: <Output File Comment>

(37) Day [Graph Grid]

- Total hours <Total Hours {in working day so far}>;
- Off-Duty <Total Hours {logged in "Off-Duty" status}>;
- Sleeper Berth <Total Hours {logged in "Sleeper berth" status}>;
- Driving <Total Hours {logged in "Driving" status}>; and
- On-Duty not driving <Total Hours {logged in "On-Duty not driving" status}>.

(38) [For each Change of Duty Status (event type 1) and Intermediate Logs Events (event type 2) specified in provisions 4.5.1.1 and 4.5.1.2] :

- <Event Sequence ID Number>;
- <Event Record Status>;
- <Event Record Origin>;
- <Event Code {Abbreviation from Table 6}>;
- <{Event} Date>;
- <{Event} Time>;
- <CMV Power Unit Number>;
- <{Accumulated} Vehicle Distance>;
- <{Elapsed} Engine Hours>;
- <{Event} Geo-Location>;
- <{Event} Latitude>;
- <{Event} Longitude>;
- <Distance Since Last Valid Coordinates>;
- <Malfunction Indicator Status {for the ELD}>; and
- <Data Diagnostic Event Indicator Status {for the Driver}>.

4.8.1.3 Information to be Shown on the Printout and Display at Roadside (cont'd)

(39) [For Each Change in Driver's Indication of Special Driving Conditions Events (event type 3) specified in provision 4.5.1.3] :

- <Event Sequence ID Number>;
- <Event Record Status>;
- <Event Record Origin>;
- <Event Code {Abbreviation from Table 6}>;
- <{Event} Date>;
- <{Event} Time>;
- <CMV Power Unit Number>;
- <{Accumulated} Vehicle Distance>;
- <{Elapsed} Engine Hours>;
- <{Total} Vehicle Distance>;
- <{Event} Geo-Location>;
- <{Event} Latitude>;
- <{Event} Longitude>;
- <Distance Since Last Valid Coordinates>;
- <Malfunction Indicator Status {for the ELD}>; and
- <Data Diagnostic Event Indicator Status {for the Driver}>.

(40) [For Each Driver's Certification of RODS Events (event type 4) specified in provision 4.5.1.4] :

- <Event Sequence ID Number>;
- <Event Code {Abbreviation from Table 6}>;
- <{Event} Date>;
- <{Event} Time>;
- <Time Zone Offset from UTC>; and
- <CMV Power Unit Number>.

(41) [For Each Malfunction and Data Diagnostic Events (event type 7) specified in provision 4.5.1.7] :

- <Event Sequence ID Number>;
- <Event Code {Abbreviation from Table 6}>;
- <Malfunction or Diagnostic Code {Abbreviation from Table 4}>;
- <{Event} Date>;
- <{Event} Time>;
- <{Total} Vehicle Distance>;
- <{Total} Engine Hours>; and
- <CMV Power Unit Number>.

4.8.1.3 Information to be Shown on the Printout and Display at Roadside (cont'd)

(42) [For Each ELD Authentication Events (event type 5) specified in provision 4.5.1.5] :

- <Event Sequence ID Number>;
- <Event Code {Abbreviation from Table 6}>;
- <{Event} Date>;
- <{Event} Time>;
- <{Total} Vehicle Distance>;
- <{Total} Engine Hours>; and
- <CMV Power Unit Number>.

(43) [For Each CMV Engine Power up / Shut Down Events (event type 6) specified in provision 4.5.1.6]

- <Event Sequence ID Number>;
- <Event Code {Abbreviation from Table 6}>;
- <{Event} Date>;
- <{Event} Time>;
- <{Total} Vehicle Distance>;
- <{Total} Engine Hours>;
- <{Event} Geo-Location>;
- <{Event} Latitude>;
- <{Event} Longitude>;
- <Distance Since Last Valid Coordinates>;
- <CMV Power Unit Number>; and
- <Trailer Number(s)>.

(44) [For Each Off-Duty Time Deferral Events (event type 20) specified in provision 4.5.1.8] :

- <Event Sequence ID Number>;
- <Event Record Status>;
- <Event Record Origin>;
- <Event Code {Abbreviation from Table 6}>;
- <{Event} Date>;
- <{Event} Time>;
- <Off-Duty Time Deferred>; and
- <CMV Power Unit Number>.

4.8.1.3 Information to be Shown on the Printout and Display at Roadside (cont'd)

(45) [For Each Change in Driver's Cycle Events (event type 21) specified in provision 4.5.1.9] :

- <Event Sequence ID Number>;
- <Event Record Status>;
- <Event Record Origin>;
- <Event Code {Abbreviation from Table 6}>;
- <{Event} Date>;
- <{Event} Time>; and
- <CMV Power Unit Number>.

(46) [For Each Change in Operating Zone Events (event type 22) specified in provision 4.5.1.10] :

- <Event Sequence ID Number>;
- <Event Record Status>;
- <Event Record Origin>;
- <Event Code {Abbreviation from Table 6}>;
- <{Event} Date>;
- <{Event} Time>;
- <{Event} Geo-Location>;
- <{Event} Latitude>;
- <{Event} Longitude>;
- <Distance Since Last Valid Coordinates>; and
- <CMV Power Unit Number>.

(47) [For each Additional Hours Events (event type 23) specified in provision 4.5.1.11] :

- <Event Sequence ID Number>;
- <Event Record Status>;
- <Event Record Origin>;
- <Date {of the day}>;
- <{Beginning of work shift} Time>;
- <{End of work shift} Time>;
- <Total Hours {logged in "Off-Duty"}>; and
- <Total Hours {logged in "On-Duty"}>.

4.8.1.3 Information to be Shown on the Printout and Display at Roadside (cont'd)

(48) [For each Annotation to driver's ELD records]:

- <Event Sequence ID Number>;
- <{Event} Date>;
- <{Event} Time>;
- <ELD Username {of the Record Edit Originator}>;
- <{Record Edit} Date>;
- <{Record Edit} Time>; and
- <{Event} Annotation>.

(49) [For each Change in Time Standard at Driver's Home Terminal Events (event type 24) specified in provision 4.5.1.12] :

- <Event Sequence ID Number>;
- <Event Record Status>;
- <Event Record Origin>;
- <Event Code {Abbreviation from Table 6}>;
- <{Event} Date>;
- <{Event} Time>;
- <{New} Time Zone Offset from UTC>; and
- <CMV Power Unit Number>.

(50) [For each Change in Co-Driver Identification Events (event type 25) specified in provision 4.5.1.13] :

- <Event Sequence ID Number>;
- <Event Code {Abbreviation from Table 6}>;
- <{Event} Date>;
- <{Event} Time>;
- <ELD Username {for the co-driver}>;
- <First Name {for the co-driver}>;
- <Last Name {for the co-driver}>;
- <{Total} Vehicle Distance>;
- <{Total} Engine Hours>; and
- <CMV Power Unit Number>.

4.8.1.3 Information to be Shown on the Printout and Display at Roadside (cont'd)

c) For the inspected driver's profile, the printout and display must show a graph-grid consistent with current HOS regulations showing each change of duty status with an <Event Record Status> currently set to "1" (active) and using the day starting time and time standard in effect at driver's home terminal for the day.

(1) On the printout, the graph-grid for each day's RODS must be at least 15 centimeters by 4 centimeters in size when printed on a "letter" paper size format.

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

d) If the ELD records units of distance in miles, it must provide a means to display the equivalent distance in kilometers.

e) The display must meet the requirements specified in this provision under all circumstances. However, the display may also provide an option to simplify the review process. When this option is selected by the driver, a subset of the required data elements and ELD event records can be omitted on the display, as described in further detail below. When a driver selects this option, the ELD must:

(1) show the graph-grid specified in provision 4.8.1.3 (c);

(2) show all data elements specified in provision 4.8.1.3 (b), except the following data elements:

i. <Event Sequence ID Number> as described in provision 7.24;

ii. <Event Record Origin> as described in provision 7.22;

iii. <{Event} Latitude> as described in provision 7.31;

iv. <{Event} Longitude> as described in provision 7.33; and

v. <Distance Since Last Valid Coordinates> as described in provision 7.9.

(3) show only ELD event records with an <Event Record Status> currently set to "1" (active).

f) For each day, the printout and display must also meet the following requirements for reporting data elements specified in provision 4.8.1.3 (b):

(1) Data elements for the header section (items 1 to 36) must be reported only for the inspected driver's profile.

(2) ELD event records for all event types (items 38 to 50) must be reported in chronological order, with all event record status types, grouped by for each section and reported with the same sequence and format as specified in Schedule 1.

(3) ELD event records for the unidentified driver profile must be reported after all information for the inspected driver's profile, and using the same <Day Starting Time> and <Time Zone Offset from UTC> parameters as the inspected driver's profile.

(4) If there is no event record to report in a section, the ELD must include the following note in this section "This section is empty – no event record to report".

g) The graph-grid specified in this provision must show a vertical line using a different style line (such as dashed or dotted line) and indicating the event time for each change in time standard at driver's home terminal event specified in provision 4.5.1.12.

h) For each day, the printout and display must list all ELD malfunction and data diagnostic events for each driver profile.

i) For all ELD event records and driver's RODS including location information, the required data element <Geo-location> must be substituted with the <Driver's Location Description> for manual entries of location information, as specified in provision 4.3.2.7.

4.8.2 ELD Output File

An ELD shall generate a consistent and secure electronic file output including an electronic document and data file compliant with the format described herein to facilitate the transfer, processing, and standardized display of ELD data sets on the authorized safety officials' computing environments.

4.8.2.1 ELD Output File Standard

The electronic document and data file included in the ELD output file must be compliant with the format and data elements specified thereafter:

a) The output document refers to an electronic document in PDF format being compliant with the printout format and data elements specified in provision 4.8.1.3 and presented as per Schedule 1.

b) The output data file refers to a data file in CSV format (UTF-8 encoding) as described in RFC 5198 (incorporated by reference in provision 6) and meeting the standards of ISO/IEC 10646:2020 (incorporated by reference in provision 6), and being compliant with the format and data elements specified in provisions 4.8.2.1.1 to 4.8.2.1.18.

c) Any data element that may contain a comma (" , ") or a carriage return (<CR>) must be replaced with a semicolon (" ; ") before generating the compliant CSV output data file.

4.8.2.1.1 Header Segment

This segment must include the following data elements and format:

- ELD File Header Segment: <CR>
- <{Driver's} Last Name>, <{Driver's} First Name>, < ELD Username {for the driver}>, <{Driver's} Driver's Licence Issuing Jurisdiction>, <{Driver's} Driver's Licence Number>, <Line Data Check Value> <CR>
- <{Co-Driver's} Last Name>, <{Co-Driver's} First Name>, <ELD Username {for the co-driver}>, <Line Data Check Value> <CR>
- <CMV Power Unit Number>, <CMV VIN>, <Trailer Number(s)>, <Line Data Check Value> <CR>
- <Carrier Name>, <{Home Terminal} Address>, <{Principal place of Business} Address>, <Cycle Used>, <Day Starting Time>, <Time Zone Offset from UTC>, <Line Data Check Value> <CR>
- <Exempt Driver Configuration>, <Line Data Check Value> <CR>
- <{Current} Date>, <{Current} Time>, <{Current} Latitude>, <{Current} Longitude, < {Current} {Total} Vehicle Distance>, <{Current} {Total} Engine Hours>, <Line Data Check Value> <CR>
- <ELD Certification Number>, <ELD Identifier>, <ELD Authentication Value>, <Output File Comment>, <Line Data Check Value> <CR>

4.8.2.1.2 User List

This segment must list all drivers and co-drivers with driving time records on the most recent CMV driven by the inspected driver and motor carrier's support personnel who requested edits within the time period for which this file is generated. The list must be in chronological order with the most recent user of the ELD on top, and include the driver being inspected, the co-driver, and the unidentified driver profile. This segment has a variable number of rows depending on the number of profiles with activity over the time period for which this file is generated. This segment must start with the following title:

- User List: <CR>

Each subsequent row must have the following data elements:

- <{Assigned User} Order Number>, <{User's} ELD Account Type>, <{User's} Last Name>, <{User's} First Name>, <{User's} Driver's Licence Number>, <Line Data Check Value> <CR>

4.8.2.1.3 CMV List

This segment must list each CMV that the current driver drove and that has been recorded on the driver's ELD records within the time period for which this file is generated. The list must be rank ordered in accordance with the date and time of CMV use with the most recent CMV being on top. This segment has a variable number of rows depending on the number of CMVs driven by the driver over the time period for which this file is generated. This segment must start with the following title:

- CMV List: <CR>

Each subsequent row must have the following data elements:

- <{Assigned CMV} Order Number>, <CMV Power Unit Number>, <CMV VIN>, <Line Data Check Value> <CR>

4.8.2.1.4 ELD Event List for Driver's RODS

This segment must list ELD event records tagged with event types 1 (a change in duty status as described in provision 4.5.1.1), 2 (an intermediate log as described in provision 4.5.1.2), and 3 (a change in driver's indication of conditions impacting driving time recording as described in provision 4.5.1.3). The segment must list all event record status types and all event record origins for the driver, rank ordered with the most current record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment has a variable number of rows depending on the number of ELD events recorded for the driver over the time period for which this file is generated. This segment must start with the following title:

- ELD Event List: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Record Status>, <Event Record Origin>, <Event Type>, <Event Code>, <{Event} Date>, <{Event} Time>, <{Accumulated} Vehicle Distance>, <{Elapsed} Engine Hours>, <{Total} Vehicle Distance>, <{Event} Latitude>, <{Event} Longitude>, <Distance Since Last Valid Coordinates>, <{Corresponding CMV} Order Number>, <{User} Order Number {for Record Originator}>, <Malfunction Indicator Status {for the ELD}>, <Data Diagnostic Event Indicator Status {for the Driver}>, <Event Data Check Value>, <Line Data Check Value> <CR>

4.8.2.1.5 ELD Event List for Annotations and Driver's Location Description

This segment must list all ELD event records that have an annotation or a manual entry of location description by the driver. This segment has a variable number of rows depending on the number of ELD event records that feature an annotation or manual location entry by the driver, rank ordered with the most current record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment must start with the following title:

- ELD Event Annotations: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <ELD Username {of the Record Originator} >, <{Event} Annotation>, <{Event} Date>, <{Event} Time>, <Driver's Location Description>, <{Record Edit} Date>, <{Record Edit} Time>, <Line Data Check Value> <CR>

4.8.2.1.6 ELD Event List for Driver's Certification of Own RODS

This segment must list ELD event records with event type 4 (driver's certification of own RODS as described in provision 4.5.1.4) for the inspected driver for the time period for which this file is generated. It must be rank ordered with the most current record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment has a variable number of rows depending on the number of certification and re-certification actions the authenticated driver may have executed on the ELD over the time period for which this file is generated. This segment must start with the following title:

- Driver's Certification/Recertification Events: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Code>, <Time Zone Offset from UTC>, <{Event} Date>, <{Event} Time>, <Date {of the certified RODS}>, <{Corresponding CMV} Order Number>, <Line Data Check Value> <CR>

4.8.2.1.7 ELD Event List for Malfunction and Data Diagnostic

This segment must list all malfunctions that have occurred on this ELD during the time period for which this file is generated. It must list diagnostic event records related to the driver being inspected, rank ordered with the most current record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment has a variable number of rows depending on the number of ELD malfunction and ELD diagnostic event records recorded and relevant to the inspected driver over the time period for which this file is generated. This segment must start with the following title:

- Malfunction and Data Diagnostic Events: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Code>, <Malfunction or Diagnostic Code>, <{Event} Date>, <{Event} Time>, <{Total} Vehicle Distance>, <{Total} Engine Hours>, <{Corresponding CMV} Order Number>, <Line Data Check Value> <CR>

4.8.2.1.8 ELD Event List for ELD Authentication Activity

This segment must list the ELD authentication activity on the ELD (ELD events with event type 5 (A driver's ELD authentication activity)) for the inspected driver for the time period for which this file is generated. It must be rank ordered with the most current record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment must start with the following title:

- ELD Authentication Events: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Code>, <ELD Username>, <{Event} Date>, <{Event} Time>, <{Total} Vehicle Distance>, <{Total} Engine Hours>, <Line Data Check Value> <CR>

4.8.2.1.9 ELD Event List for CMV's Engine Power-Up and Shut Down Activity

This segment must list the records created when a CMV's engine is powered up and shut down (ELD events with event type 6 (CMV's engine power up/shut down)) for the time period for which this file is generated. It must be rank ordered with the most current record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment must start with the following title:

- CMV's Engine Power-Up and Shut Down Events: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Code>, <{Event} Date>, <{Event} Time>, <{Total} Vehicle Distance>, <{Total} Engine Hours>, <{Event} Latitude>, <{Event} Longitude>, <Distance Since Last Valid Coordinates>, <CMV Power Unit Number>, <CMV VIN>, <Trailer Number(s)>, <Line Data Check Value> <CR>

4.8.2.1.10 ELD Event List for the Unidentified Driver Profile

This segment must list the ELD event records for the Unidentified Driver profile, rank ordered with most current record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment has a variable number of rows depending on the number of Unidentified Driver ELD records recorded over the time period for which this file is generated. This segment must start with the following title:

- Unidentified Driver Profile Events: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Record Status>, <Event Record Origin>, <Event Type>, <Event Code>, <{Event} Date>, <{Event} Time>, <{Accumulated} Vehicle Distance>, <{Elapsed} Engine Hours>, <{Event} Latitude>, <{Event} Longitude>, <Distance Since Last Valid Coordinates>, <{Corresponding CMV} Order Number>, <Malfunction Indicator Status {for the ELD}>, <Event Data Check Value>, <Line Data Check Value> <CR>

4.8.2.1.11 [Reserved]

4.8.2.1.12 ELD Event List for Off-Duty Time Deferral

This segment must list the ELD event records with event type 20 (Off-Duty Time Deferral as described in provision 4.5.1.8) for the inspected driver for the time period for which this file is generated. It must be rank ordered with the most recent record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment has a variable number of rows depending on the number of Off-Duty Time Deferral records recorded over the time period for which this file is generated. This segment must start with the following title:

- Off-Duty Time Deferral Events: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Record Status>, <Event Record Origin>, <Event Type>, <Event Code>, <{Event} Date>, <{Event} Time>, <{Corresponding CMV} Order Number>, <{User} Order Number {for Record Originator}>, <Off-Duty Time Deferral Status>, <Off-Duty Time Deferred>, <Line Data Check Value> <CR>

4.8.2.1.13 ELD Event List for Change in Driver's Cycle

This segment must list the ELD event records with event type 21 (Change in Driver's Cycle as described in provision 4.5.1.9) for the inspected driver for the time period for which this file is generated. It must be rank ordered with the most recent record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment has a variable number of rows depending on the number of Change in Driver's Cycle records recorded over the time period for which this file is generated. This segment must start with the following title:

- Change in Driver's Cycle Events: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Record Status>, <Event Record Origin>, <Event Type>, <Event Code>, <{Event} Date>, <{Event} Time>, <{Corresponding CMV} Order Number>, <{User} Order Number {for Record Originator}>, <{New} Cycle Used>, <Line Data Check Value> <CR>

4.8.2.1.14 ELD Event List for Change in Operating Zone

This segment must list the ELD event records with event type 22 (Change in Operating Zone as described in provision 4.5.1.10) for the inspected driver for the time period for which this file is generated. It must be rank ordered with the most recent record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment has a variable number of rows depending on the number of Change in Operating Zone records recorded over the time period for which this file is generated. This segment must start with the following title:

- Change in Operating Zone Events: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Record Status>, <Event Record Origin>, <Event Type>, <Event Code>, <{Event} Date>, <{Event} Time>, <{Event} Latitude>, <{Event} Longitude>, <Distance Since Last Valid Coordinates>, <{Corresponding CMV} Order Number>, <{User} Order Number {for Record Originator}>, <{New} Operating Zone>, <Line Data Check Value> <CR>

4.8.2.1.15 ELD Event List for Additional Hours

This segment must list the ELD event records with event type 23 (Additional Hours as described in provision 4.5.1.11) for the inspected driver for the time period for which this file is generated. It must be rank ordered with the most recent record on top in accordance with the <Date {of the day}> data element of each record. This segment has a variable number of rows depending on the number of records for Additional Hours that were recorded over the time period for which this file is generated. This segment must start with the following title:

- Additional Hours Events: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Record Status>, <Event Record Origin>, <Event Type>, <Event Code>, <{Event} Date>, <{Event} Time>, <Date {of the day}>, <{Beginning of work shift} Time>, <{End of work shift} Time>, <Total Hours {logged in "Off-Duty"}>, <Total Hours {logged in "On-Duty"}>, <{User} Order Number {for Record Originator}>, <Line Data Check Value> <CR>

4.8.2.1.16 ELD Event List for Change in Time Standard at Driver's Home Terminal

This segment must list the ELD event records with event type 24 (Change in Time Standard at Driver's Home Terminal as described in provision 4.5.1.12) for the inspected driver for the time period for which this file is generated. It must be rank ordered with the most recent record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment has a variable number of rows depending on the number of Change in Time Standard at Driver's Home Terminal records recorded over the time period for which this file is generated. This segment must start with the following title:

- Change in Time Standard at Driver's Home Terminal Events: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Record Status>, <Event Record Origin>, <Event Type>, <Event Code>, <{Event} Date>, <{Event} Time>, <{Corresponding CMV} Order Number>, <{User} Order Number {for Record Originator}>, <{New} Time Zone Offset from UTC >, <Line Data Check Value> <CR>

4.8.2.1.17 ELD Event List for Change in Co-Driver Identification

This segment must list the ELD event records with event type 25 (Change in co-driver's identification as described in provision 4.5.1.13) for the inspected driver for the time period for which this file is generated. It must be rank ordered with the most recent record on top in accordance with the <{Event} Date> and <{Event} Time> data elements of each record. This segment has a variable number of rows depending on the number of Change in Co-Driver's Identification records recorded over the time period for which this file is generated. This segment must start with the following title:

- Change in Co-Driver's Identification Events: <CR>

Each subsequent row must have the following data elements:

- <Event Sequence ID Number>, <Event Code>, <{Event} Date>, <{Event} Time>, <ELD Username {for the co-driver}>, <{Corresponding CMV} Order Number>, <{User} Order Number {for the co-driver}>, <{Total} Vehicle Distance>, <{Total} Engine Hours>, <Line Data Check Value> <CR>

4.8.2.1.18 File Data Check Value

This segment lists the <File Data Check Value> as specified in provision 4.4.5.3. This segment includes a single line as follows:

- End of File: <CR>
- <File Data Check Value> <CR>

4.8.2.2 ELD Output File Name Standard

For each electronic document and data file specified in provision 4.8.2.1, the ELD must follow the 25 character-long filename standard for transfer of electronic documents and data files to authorized safety officials:

a) The first five position characters of the filename must correspond to the first five letters of the <Last Name> of the driver for whom the file is compiled. If the <Last Name> of the driver is shorter than five characters, remaining positions must use the character "_" [underscore] as a substitute character. For example, if the <Last Name> of the driver is "Lee", the first five characters of the ELD output file must feature "Lee_ _".

b) The sixth and seventh position characters of the filename must correspond to the last two digits of the <Driver's Licence Number> for the driver for whom the file is compiled.

c) The eighth and ninth position characters of the filename must correspond to the sum of all individual numeric digits in the <Driver's Licence Number> for the driver for whom the file is compiled. The result must be represented in two-digit format. If the sum value exceeds 99, use the last two digits of the result. For example, if the result equals "113", use "13". If the result is less than 10, use 0 as the first digit. For example, if the result equals "5", use "05".

d) The tenth through fifteenth position characters of the filename must correspond to the <Date> the file is created. The result must be represented in six-digit format "MMDDYY" where "MM" represents the month, "DD" represents the day, and "YY" represents the last two digits of the year. For example, February 5, 2013, must be represented as "020513".

e) The sixteenth position character of the filename must be a hyphen "-".

f) The seventeenth through twenty-fifth position characters of the filename must start at "000000000" by default. When an output file is generated more than once in a day for the same driver, the ELD must produce distinct filenames for each electronic document and data file specified in provision 4.8.2.1. Then each of these nine digits can be freely configured by the motor carrier or the ELD provider to be a number between 0 and 9 or a character between A and Z, as per the convention described in this provision. ELD providers or motor carriers do not need to disclose details of conventions they may use for configuring the seventeenth through twenty-fifth digits of the filename.

4.9 Data Transfer Capability Requirements

An ELD shall present the captured ELD RODS of a driver in the standard electronic format as described below, and transfer the ELD output files(s) specified in provision 4.8.2 to an authorized safety official, on demand, for inspection purposes.

4.9.1 Transfer of Electronic Files During Roadside Safety Inspections

a) On demand during a roadside safety inspection, an ELD must produce ELD RODS for the current day and each day specified in subsection 84(a) of the current HOS regulations, and compliant with the ELD output file requirements specified in provision 4.8.2.

b) When a driver uses the single-step driver interface, as described in provision 4.3.2.4, to indicate that the ELD compile and transfer the driver's ELD RODS to authorized safety officials, the ELD must transfer the generated ELD output file(s) to the computing environment used by authorized safety officials via the standards referenced in this provision. To meet requirements for ELD output file(s) transfer during roadside inspections, the ELD must support at least the email transfer method.

c) In addition to the email transfer method specified in provision 4.9.1 (b), the ELD may also include any of the following local transfer method:

   (1) USB2 (incorporated by reference, see provision 6), or

   (2) Bluetooth (incorporated by reference, see provision 6).

d) An ELD must verify proper operation of each transfer mechanism supported by the ELD, as specified in provision 4.6.1.7.

4.9.2 Motor Carrier Data Reporting

a) An ELD shall retain copies of electronic ELD RODS for the prescribed retention period specified in subsection 85(3)(b) of the current HOS regulations.

b) An ELD must produce, on demand, a report or a series of reports of ELD RODS for a subset of its drivers, a subset of its vehicles, and for a subset of the prescribed retention period, and must be either on a printout format as specified in provision 4.8.1.3 or in electronic format as specified in provision 4.8.2.1.

c) At a minimum, an ELD shall transfer the ELD RODS electronically by one of the following transfer mechanisms:

   (1) E-mail as specified in provision 4.10.1.2, or

   (2) USB 2.0 as specified in provision 4.10.1.3, or

   (3) Bluetooth as specified in provision 4.10.1.4.

d) When the ELD is producing ELD RODS as specified in this provision and for a period excluding the current day and all the days specified in subsection 84(a) of the current HOS regulations:

   (1) The following data elements specified in provisions 4.8.1.3 (b) and 4.8.2.1.1 may be left blank if they are not available or cannot accurately be determined:

      i. <{Current} {Total} Vehicle Distance> as described in provision 7.43;

      ii. <{Current} {Total} Engine Hours> as described in provision 7.19; and

      iii. <{Current} Geo-location> as described in provision 7.29.

   (2) The following data elements specified in provisions 4.8.1.3 (b) and 4.8.2.1.1 must be replaced with the character "X" if they are not available or cannot accurately be determined:

      i. <{Current} Latitude> and <{Current} Longitude> as described in provisions 7.31 and 7.33.

4.10 Communications Standards for the Transmittal of Data Files from ELDs

An ELD must transmit ELD RODS electronically in accordance with the ELD output file format specified in provision 4.8.2.1 and shall transfer these RODS to authorized safety officials upon request, as specified in provision 4.9.

4.10.1 Communications Standards for the Transmittal of Data Files from ELDs

For each type of data transfer mechanism, an ELD must follow the specifications in this provision.

4.10.1.1 [Reserved]

4.10.1.2 Wireless Data Transfer Through E-Mail

a) The ELD must attach the ELD output file specified in provision 4.8.2 to an email message to be sent using the SMTP as specified in RFC 5321 (incorporated by reference in provision 6), to a specific email address, which will be provided by authorized safety officials when requested during a roadside inspection.

b) The ELD output file must have the format specified in provision 4.8.2.1 and must be encrypted using the S/MIME as specified in RFC 5751 (incorporated by reference in provision 6), and the RSA algorithm as specified in RFC 4056 (incorporated by reference in provision 6), with the public key compliant with the Canadian PKI Infrastructure to be provided to the ELD provider at the time of the ELD certification process. The content must be encrypted using AES in FIPS Publication 197 (incorporated by reference in provision 6), and RFC 3565 (incorporated by reference in provision 6).

c) The email must be formatted using the Internet Message Format as specified in RFC 5322 (incorporated by reference in provision 6), as follows:

Element	Format
To	<Address provided for central server or by authorized safety officials during a roadside inspection>
From	<Desired return address for confirmation>
Subject	ELD RODS from <ELD Certification Number> <':'> <ELD Identifier>
Body	<Output File Comment>
Attachment	MIME encoded AES–256 encrypted file with <filename>. <Date string>. <unique identifier>.

d) For purposes of ELD compliance to this provision, the subject element of the email must identify the ELD transferring the data.

4.10.1.3 Data Transfer via USB 2.0

a) An ELD certified for the USB data transfer mechanism shall transfer ELD RODS using the Universal Serial Bus Specification (Revision 2.0) (incorporated by reference in provision 6).

b) Each ELD technology must implement a single USB-compliant interface with the necessary adaptors for a Type A connector. The USB interface must implement the Mass Storage class (08h) for driverless operation, to comply with IEEE standard 1667-2009, (incorporated by reference in provision 6).

c) The ELD shall provide power to a standard USB-compatible drive.

d) An ELD must re-authenticate the driver prior to saving the driver's ELD output file(s) to an external device.

e) On initiation by an authenticated driver, an ELD shall save ELD output file(s) to USB-compatible drives (AES, in FIPS Publication 197, incorporated by reference in provision 6) that are provided by authorized safety officials during an inspection.

4.10.1.4 Data Transfer via Bluetooth®

a) Bluetooth SIG Specification of the Bluetooth System covering core package version 2.1 + EDR (incorporated by reference in provision 6) must be followed. An ELD using this standard shall display a Personal Identification Number generated by the Bluetooth application profile for bonding with other devices.

b) Upon request of an authorized official, the ELD must become discoverable by the authorized safety officials' Bluetooth-enabled computing platform, and generate a random code, which the driver must share with the official.

c) An ELD must re-authenticate the driver prior to transmitting the driver's ELD output file(s) to an external device.

d) The ELD must connect to the roadside authorized safety officials' technology via Bluetooth and transfer the required ELD output file(s) to the Bluetooth compatible device (AES, in FIPS Publication 197, incorporated by reference in provision 6).

4.10.2 Motor Carrier Data Transmission

Regardless of the roadside transmission option supported by an ELD, the ELD shall retain ELD RODS and transmit enforcement-specified historical data for their drivers using one of the methods specified under provision 4.9.2.

a) The email option must follow the specifications described under provision 4.10.1.2.

b) The USB option must follow the specifications of Universal Serial Bus Specification, revision 2.0 (incorporated by reference in provision 6) and described in provision 4.10.1.3.

c) Bluetooth must follow the specifications incorporated by reference in provision 6 and described in provision 4.10.1.4.

4.11 Cellular and Satellite Communication Services

a) An ELD must be compliant with all specifications and requirements set out in this Standard, but the data transfer process for the following ELD functions may not be fully functional when cellular or satellite communication services are not available:

(1) Driver authentication and retrieving of complete ELD RODS for that driver, as specified in provision 4.1.4 (c);

(2) Transmission of driver prompts for changes associated to ELD functions implemented for the motor carrier and support personnel, as specified in provision 4.3.2.2.4;

(3) Transmission of new ELD configuration settings and requests for corrective edits to driver's RODS, as specified in provisions 4.3.3.1.1 through 4.3.3.1.3;

(4) ELD timing compliance monitoring with an accurate external UTC source, as specified in provision 4.6.1.3;

(5) Email data transfer compliance monitoring, as specified in provision 4.6.1.7 (a);

(6) Driver's access to own ELD RODS – excluding all the days specified in subsections 84(a) and (b) of the current HOS regulations, as specified in provision 4.7.2;

(7) Recording ELD events in a software application, as specified in provision 4.7.4;

(8) Email transferring of ELD output files(s) to authorized safety officials, as specified in provision 4.9.1 (b); and

(9) Email transferring of ELD RODS by the motor carrier, as specified in provision 4.9.2 (c).

b) If an ELD function specified in this provision is used by the driver when cellular or satellite communication services are not available, the ELD must notify the driver as to its limited operability status for the data transfer process during that period.

c) For each cellular or satellite communication services implemented in the ELD:

(1) The ELD must provide to the driver a recognizable visual indicator, and may provide an audible signal, as to its operability status for the data transfer process.

(2) The ELD's operability status for the data transfer process must be indicated to all drivers using that ELD and continuously communicated to the driver when the ELD is powered.

5. [RESERVED]

6. REFERENCES

a) [Reserved]

b) Bluetooth SIG, Inc. 5209 Lake Washington Blvd. NE., Suite 350, Kirkland, WA 98033, https://www.bluetooth.com, (425) 691–3535.

(1) Bluetooth SIG, Inc., Specification of the Bluetooth System: Wireless Connections Made Easy, Covered Core Package version 2.1 + EDR, volumes 0 through 4, approved July 26, 2007, IBR in provisions 4.9.1, 4.9.2, 4.10.1.4, 4.10.2.

(2) [Reserved]

c) Institute of Electrical and Electronic Engineers (IEEE) Standards Association. 445 Hoes Lane, Piscataway, NJ 08854–4141, http://standards.ieee.org/index.html, (732) 981–0060

(1) IEEE Std 1667–2009, IEEE Standard for Authentication in Host Attachments of Transient Storage Devices, approved 11 November 2009, IBR in provision 4.10.1.3.

(2) [Reserved]

d) Internet Engineering Task Force (IETF). C/o Association Management Solutions, LLC (AMS), 48377 Freemont Blvd., Suite 117, Freemont, CA 94538, (510) 492–4080.

(1) IETF RFC 3565, Use of the Advanced Encryption Standard (AES) Encryption Algorithm in Cryptographic Message Syntax (CMS), approved July 2003, IBR in provision 4.10.1.2.

(2) IETF RFC 4056, Use of the RSASSA–PSS Signature Algorithm in Cryptographic Message Syntax (CMS), approved June 2005, IBR in provision 4.10.1.2.

(3) IETF RFC 5198, Unicode Format for Network Interchange, approved March 2008, IBR in provision 4.8.2.1.

(4) IETF RFC 5321, Simple Mail Transfer Protocol, approved October 2008, IBR in provision 4.10.1.2.

(5) IETF RFC 5322, Internet Message Format, approved October 2008, IBR in provision 4.10.1.2.

(6) IETF RFC 5751, Secure/Multipurpose Internet Mail Extensions (S/MIME) Version 3.2, Message Specification, approved January 2010, IBR in provision 4.10.1.2.

e) ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission). Chemin de Blandonnet 8, PO Box 401, 1214 Vernier, Geneva, Switzerland, http://www.iso.org, +41 22 749 01 11

(1) ISO/IEC 10646:2020, ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission), Information technology — Universal coded character set (UCS), 6th Edition, December 2020, IBR in provision 4.8.2.1.

f) National Institute of Standards and Technology (NIST). 100 Bureau Drive, Stop 1070, Gaithersburg, MD 20899–1070, http://www.nist.gov, (301) 975–6478

(1) Federal Information Processing Standards Publication (FIPS PUB) 197, Advanced Encryption Standard (AES), approved November 26, 2001, IBR in provisions 4.10.1.2 and 4.10.1.3.

(2) [Reserved]

6. REFERENCES (cont'd)

g) Universal Serial Bus Implementers Forum (USBIF). 3855 SW. 153rd Drive, Beaverton, Oregon 97006, http://www.usb.org, (503) 619–0426.

(1) USB Implementers Forum, Inc., Universal Serial Bus Specification, Revision 2.0, approved April 27, 2000, as revised through April 3, 2015, IBR in provisions 4.9.1, 4.9.2, 4.10.1.3, and 4.10.2.

(2) [Reserved]

h) Canadian Council of Motor Transport Administrator (CCMTA), 1111 Prince of Wales Drive, Suite 404, Ottawa (ON), K2C 3T2, https://ccmta.ca/en/, (613) 736-1003

(1) Canadian geo-location Data Base. IBR in provisions 4.4.2 and 7.29.

7. DATA ELEMENTS DISCTIONARY

7.1 Day Starting Time

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

Purpose: Identifies the bookends of the work day for the driver; makes ELD RODS consistent with current HOS regulations requirements.

Source: Motor carrier or driver.

Used in: ELD account profile; ELD outputs.

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.

Data Range: 000000 to 235959; first two digits 00 to 23; middle two digits and last two digits 00 to 59.

Data Length: 6 characters.

Data Format: <Day Starting Time> as in <HHMMSS> where "HH" refers to hours, "MM" refers to minutes, and "SS" refers to seconds; designation for start time expressed in time standard in effect at the driver's home terminal.

Disposition: Mandatory.

Examples: [060000], [073000], [180000].

7.2 Carrier Name

Description: This data element 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.

Used in: ELD account profile.

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

Data Range: Any character combination (UTF-8).

Data Length: Minimum: 4; Maximum: 120 characters.

Data Format: <Carrier Name> as in <CCCC> to <CCCC. . . . . .CCCC>.

Disposition: Mandatory.

Example: [CONSOLIDATED TRUCKLOAD INC.].

7.3 [RESERVED]

7.4 CMV Power Unit Number

Description: This data element 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's ELD records are recorded; Makes ELD RODS consistent with current HOS regulations requirements.

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

Used in: ELD event records; ELD output file.

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

Data Range: Any alphanumeric combination.

Data Length: Minimum: 1; Maximum: 10 characters.

Data Format: <CMV Power Unit Number> as in <C> to <CCCCCCCCCC>.

Disposition: Mandatory for all CMVs driven while using an ELD.

Examples: [123], [00123], [BLUEKW123], [TX12345], [L123456QC].

7.5 CMV VIN

Description: This data element 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.

Used in: ELD event records; ELD output file.

Data Type: Retrieved from the engine ECM or the vehicle's databus. Entered or edited by the driver or the motor carrier.

Data Range: Either blank or 17 characters long as specified in CMVSS 115, or 18 characters long with first character assigned as "-" (dash) followed by the 17-character long VIN. Check digit, i.e., VIN character position 9, as specified in CMVSS 115 must imply a valid VIN.

Data Length: Blank or 17–18 characters.

Data Format: <CMV VIN> or <"-"> <CMV VIN> or <{blank}> as in <CCCCCCCCCCCCCCCCC>, or <-CCCCCCCCCCCCCCCC> or <>.

Disposition: Mandatory for all ELDs linked to the engine ECM and when the VIN is available from the engine ECM or the vehicle's databus; otherwise optional. If entered manually or edited, the ELD must precede the VIN with the character "-" in the driver's RODS.

Examples: [1FUJGHDV0CLBP8834], [-FUJGHDV0CLBP8896], [].

7.6 Annotation

Description: This data element refers to a textual note related to a record, update, or edit capturing the annotation a driver or authorized support personnel may input to the ELD.

Purpose: Provides ability for a driver or an authorized support personnel to offer explanations to records, selections, edits, or entries. Makes ELD RODS consistent with current HOS regulations requirements.

Source: Driver or motor carrier.

Used in: ELD events; ELD outputs.

Data Type: Entered by the authenticated user via ELD's interface.

Data Range: Free form text of any alphanumeric combination.

Data Length: 0–60 characters if optionally entered; 4–60 characters if annotation is required and driver is prompted by the ELD.

Data Format: <Annotation> as in <{blank}> or <C> to <CCC. . . . . CCC>.

Disposition: Optional in general; Mandatory if prompted by ELD.

Examples: [], [Personal use. Driving to Restaurant in bobtail mode], [Forgot to switch to SB. Correcting here].

7.7 Data Diagnostic Event Indicator Status

Description: This data element is a Boolean indicator identifying whether the used ELD unit has an active data diagnostic event set for the authenticated driver at the time of event recording.

Purpose: Documents the snapshot of ELD's data diagnostic status for the authenticated driver at the time of an event recording.

Source: ELD internal monitoring functions.

Used in: ELD events; ELD outputs.

Data Type: Internally monitored and managed.

Data Range: 0 (no active data diagnostic events for the driver) or 1 (at least one active data diagnostic event set for the driver).

Data Length: 1 character.

Data Format: <Data Diagnostic Event Indicator Status> as in <C>.

Disposition: Mandatory.

Examples: [0] or [1].

7.8 Date

Description: In combination with the <Time>, this data element 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 provision 4.4.3.

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

Source: ELD's converted time measurement.

Used in: ELD events; ELD outputs.

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 provision 4.4.3.

Data Range: Any valid date combination expressed in <MMDDYY> format where <MM> must be between 01 and 12, <DD> must be between 01 and 31, and <YY> must be between 00 and 99.

Data Length: 6 characters.

Data Format: <Date> as in <MMDDYY> where "MM" refers to months, "DD" refers to days of the month and "YY" refers to the last two digits of the calendar year.

Disposition: Mandatory.

Examples: [122815], [010114], [061228].

7.9 Distance Since Last Valid Coordinates

Description: This data element refers to the distance in whole kilometers traveled since the last valid <Latitude> and <Longitude> pair the ELD measured with the required accuracy.

Purpose: Provides ability to keep track of location for recorded events in cases of temporary position measurement outage.

Source: ELD internal calculations.

Used in: ELD events; ELD outputs.

Data Type: Kept track of by the ELD based on position measurement validity.

Data Range: An integer value between 0 and 9; If the distance traveled since the last valid coordinate measurement exceeds 9 kilometers, the ELD must use the value as 9.

Data Length: 1 character.

Data Format: <Distance Since Last Valid Coordinates> as in <C>.

Disposition: Mandatory.

Examples: [0], [1], [5], [6].

7.10 Driver's Licence Issuing Jurisdiction

Description: This data element refers to the issuing jurisdiction of the listed Driver's Licence for the ELD account holder.

Purpose: In combination with the <Driver's Licence 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's licence.

Used in: ELD account profile(s); ELD output file.

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

Data Range: Two or three-character abbreviation listed on Table 5.

Data Length: 2-3 characters.

Data Format: <Driver's Licence Issuing Jurisdiction> as in <CC> or <CCC>.

Disposition: Mandatory for all driver accounts created on the ELD; optional for "non-driver" accounts.

Examples: [QC], [ON], [MB], [NLE].

7.11 Driver's Licence Number

Description: This data element refers to the unique Driver's Licence information required for each driver account on the ELD.

Purpose: In combination with the <Driver's Licence 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's licence.

Used in: ELD account profile(s); ELD output file.

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

Data Range: Any alphanumeric combination.

Data Length: Minimum: 1; Maximum: 20 characters.

Data Format: <Driver's Licence Number> as in <C> to <CCCCCCCCCCCCCCCCCCCC>. For ELD record keeping purposes, ELD must only retain characters in a <Driver's Licence Number> entered during an account creation process that are a number between 0–9, a character between A–Z (non-case sensitive), or an asterisk (*), and excluding any separation character (e.g., hyphen), diacritic, apostrophe, space, comma, period or other special characters.

Disposition: Mandatory for all driver accounts created on the ELD; optional for "non-driver" accounts.

Examples: [SAMPLMJ065LD], [D000368210361], [198], [N02632676353666], [LEE**JR012345].

7.12 Driver's Location Description

Description: This data element refers to a textual note related to the location of the CMV input by the driver upon ELD's prompt.

Purpose: Provides ability for a driver to enter location information related to entry of missing records; provides ability to accommodate temporary positioning service interruptions or outage without setting positioning malfunctions.

Source: Driver, only when prompted by the ELD.

Used in: ELD events; ELD outputs.

Data Type: Entered by the authenticated driver when ELD solicits this information as specified in provision 4.3.2.7.

Data Range: Free form text of any alphanumeric combination.

Data Length: 5–60 characters.

Data Format: <Driver's Location Description> as in <CCCCC> to <CCC.....CCC>.

Disposition: Mandatory when prompted by ELD.

Examples: [], [12 km North of North Bay, ON], [Vancouver, BC].

7.13 ELD Account Type

Description: This data element refers to an indicator designating whether an ELD account is a driver account or support personnel (non-driver) account.

Purpose: Enables authorized safety officials to verify account type specific requirements set forth in this Standard.

Source: ELD designated.

Used in: ELD outputs.

Data Type: Specified by the motor carrier during the account creation process and recorded on ELD.

Data Range: Character "D", indicating account type "Driver", or "S", indicating account type "motor carrier's support personnel" (i.e. non-driver); "Unidentified Driver" account must be designated with type "D".

Data Length: 1 character.

Data Format: <ELD Account Type> as in <C>.

Disposition: Mandatory.

Examples: [D], [S].

7.14 ELD Authentication Value

Description: This data element refers to 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.

Used in: ELD outputs.

Data Type: Calculated from the authentication key and calculation procedure privately distributed by the ELD provider to the certification entity during the ELD certification process.

Data Range: Alphanumeric combination.

Data Length: Greater than 16 characters.

Data Format: <ELD Authentication Value> as in <CCCC.....CCCC>.

Disposition: Mandatory.

Example: [D3A4506EC8FF566B506EC8FF566BDFBB].

7.15 ELD Identifier

Description: This data element refers to a unique alphanumeric identifier assigned by the ELD provider to each ELD model and associated software version(s) currently certified and implemented in the ELD.

Purpose: Provides ability to cross-check that the ELD model and software version used in the recording, retaining, reporting, and transferring of a driver's RODS were certified through the ELD certification process.

Source: Assigned by the ELD provider and submitted to the certification body during the ELD certification or re-certification process.

Used in: ELD outputs.

Data Type: Coded on the ELD by the ELD provider, once the ELD is certified.

Data Range: Free form text of any alphanumeric combination.

Data Length: 6 characters.

Data Format: <ELD Identifier> as in <CCCCCC>.

Disposition: Mandatory.

Examples: [1001ZE], [GAM112], [02P3P1].

7.16 ELD Provider

Description: This data element is an alphanumeric company name of the ELD provider disclosed during the ELD certification process.

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.

Source: Assigned and submitted by the ELD provider during the ELD certification process.

Used in: ELD outputs.

Data Type: Coded on the ELD by the ELD provider and disclosed to the certification entity during the ELD certification process.

Data Range: Any alphanumeric combination.

Data Length: Minimum: 4; Maximum 120 characters.

Data Format: <ELD Provider> as in <CCCC> to <CCCC.....CCCC>.

Disposition: Mandatory.

Examples: [ELD PROVIDER INC].

7.17 ELD Certification Number

Description: This data element refers to a unique alphanumeric identifier assigned to each ELD model and associated software version(s) currently certified and implemented in the ELD.

Purpose: Provides ability to cross-check that the ELD model and software version used in the recording, retaining, reporting, and transferring of a driver's RODS were certified through the ELD certification process.

Source: Received from the certification body when the ELD model and software version are certified or re-certified.

Used in: ELD outputs.

Data Type: Coded on the ELD by the provider, once the ELD is certified or re-certified.

Data Range: A four-character alphanumeric certification identifier using characters A–Z and numbers 0–9.

Data Length: 4 characters.

Data Format: <ELD Certification Number> as in <CCCC>.

Disposition: Mandatory.

Examples: [ZA10], [QA0C], [FAZ2].

7.18 ELD Username

Description: This data element 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'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.

Used in: ELD account profile; event records; ELD authentication process.

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

Data Range: Any alphanumeric combination.

Data Length: Minimum: 4; Maximum: 60 characters.

Data Format: <ELD Username> as in <CCCC> to <CCCC.....CCCC>.

Disposition: Mandatory for all accounts created on the ELD.

Examples: [smithj], [100384], [sj2345], [john.smith].

7.19 Engine Hours

Description: This data element refers to the time the CMV's engine is powered in decimal hours with 0.1 hour (6-minute) resolution. It is a placeholder for <{Total} Engine Hours>, which refers to the aggregated time of a vehicle's engine's 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 engine's 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 vehicle's 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.

Used in: ELD events; ELD outputs.

Data Type: Acquired from the engine ECM or a comparable other source as allowed in provision 4.3.1.4.

Data Range: For <{Total} Engine Hours>, range is between 0.0 and 99 999.9; for <{Elapsed} Engine Hours>, range is between 0.0 and 99.9.

Data Length: 3–7 characters.

Data Format: <Engine Hours> as in <C.C> to <CCCCC.C>.

Disposition: Mandatory.

Examples: [0.0], [9.9], [346.1], [2891.4].

7.20 Event Code

Description: This data element is a dependent attribute on the <Event Type> parameter and that further specifies the nature of the change indicated in the <Event Type>. It indicates the new status after the change.

Purpose: Provides ability to code the specific nature of the change electronically.

Source: ELD internal calculations.

Used in: ELD event records; ELD outputs.

Data Type: ELD recorded and maintained event attribute in accordance with the type of event and nature of the new status being recorded.

Data Range: Dependent on the <Event Type> as indicated on Table 6.

Data Length: 1 character.

Data Format: <Event Code> as in <C>.

Disposition: Mandatory.

Examples: [0], [1], [4], [9].

7.21 Event Data Check Value

Description: This data element refers to a hexadecimal "check" value calculated in accordance with the procedure outlined in provision 4.4.5.1 and attached to each event record at the time of recording.

Purpose: Provides ability to identify cases where an ELD event record may have been inappropriately modified after its original recording.

Source: ELD internal.

Used in: ELD events; ELD output file.

Data Type: Calculated by the ELD in accordance with provision 4.4.5.1.

Data Range: A number between hexadecimal 00 (decimal 0) and hexadecimal FF (decimal 255).

Data Length: 2 characters.

Data Format: <Event Data Check Value> as in <CC>.

Disposition: Mandatory.

Examples: [05], [CA], [F3].

7.22 Event Record Origin

Description: This data element is an attribute for the event record indicating whether it is automatically recorded, or edited, entered or accepted by the driver, requested by another authenticated user, assumed from unidentified driver profile, or related to additional hours recorded for another motor carrier or ELD system.

Purpose: Provides ability to track origin of the records.

Source: ELD internal calculations.

Used in: ELD event records; ELD outputs.

Data Type: ELD recorded and maintained event attribute in accordance with the procedures outlined in provisions 4.4.4.2.2 to 4.4.4.2.9 and 4.3.2.2.4 (c).

Data Range: 1, 2, 3, 4 or 5 as described on Table 7.

Data Length: 1 character.

Data Format: <Event Record Origin> as in <C>.

Disposition: Mandatory.

Examples: [1], [2], [3], [4], [5].

7.23 Event Record Status

Description: This data element is an attribute for the event record indicating whether an event is active or inactive and further, if inactive, whether it is due to a change or lack of confirmation by the driver or due to a driver's rejection of change request.

Purpose: Provides ability to keep track of edits and entries performed over ELD records while retaining original records.

Source: ELD internal calculations.

Used in: ELD event records; ELD outputs.

Data Type: ELD recorded and maintained event attribute in accordance with the procedures outlined in provisions 4.4.4.2.2 to 4.4.4.2.9.

Data Range: 1, 2, 3 or 4 as described on Table 8.

Data Length: 1 character.

Data Format: <Event Record Status> as in <C>.

Disposition: Mandatory.

Examples: [1], [2], [3], [4].

7.24 Event Sequence ID Number

Description: This data element refers to the serial identifier assigned to each required ELD event as described in provisions 4.5.1.1 to 4.5.1.13.

Purpose: Provides ability to keep a continuous record, on a given ELD, across all users of that ELD.

Source: ELD internal calculations.

Used in: ELD event records; ELD outputs.

Data Type: ELD maintained; incremented by 1 for each new record on the ELD; continuous for each new event the ELD records regardless of owner of the records.

Data Range: 0 to FFFF; initial factory value must be 0; after FFFF hexadecimal (decimal 65535), the next Event Sequence ID number must be 0.

Data Length: 1–4 characters.

Data Format: <Event Sequence ID Number> as in <C> to <CCCC>.

Disposition: Mandatory.

Examples: [1], [1F2C], [A2D3], [BB], [FFFE].

7.25 Event Type

Description: This data element is an attribute specifying the type of the event record.

Purpose: Provides ability to code the type of the recorded event in electronic format.

Source: ELD internal calculations.

Used in: ELD event records; ELD outputs.

Data Type: ELD recorded and maintained event attribute in accordance with the type of event being recorded.

Data Range: 1–25 as described on Table 9.

Data Length: 1-2 characters.

Data Format: <Event Type> as in <C> to <CC>.

Disposition: Mandatory.

Examples: [1], [5], [4], [22].

7.26 Exempt Driver Configuration

Description: This data element refers to a parameter indicating whether the motor carrier configured a driver's profile to claim exemption from ELD use.

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

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

Used in: ELD outputs.

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.

Data Range: E (exempt) or 0 (number zero).

Data Length: 1 character.

Data Format: <Exempt Driver Configuration> as in <C>.

Disposition: Mandatory.

Examples: [E], [0].

7.27 File Data Check Value

Description: This data element refers to a hexadecimal "check" value calculated in accordance with the procedure outlined in provision 4.4.5.3 and attached to each ELD output file.

Purpose: Provides ability to identify cases where an ELD file may have been inappropriately modified after its original creation.

Source: ELD internal.

Used in: ELD output files.

Data Type: Calculated by the ELD in accordance with provision 4.4.5.3.

Data Range: A number between hexadecimal 0000 (decimal 0) and hexadecimal FFFF (decimal 65535).

Data Length: 4 characters.

Data Format: <File Data Check Value> as in <CCCC>.

Disposition: Mandatory.

Examples: [F0B5], [00CA], [523E].

7.28 First Name

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

Purpose: Links an individual to the associated ELD account.

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

Used in: ELD account profile(s); ELD outputs (display and file).

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

Data Range: Any character combination (UTF-8).

Data Length: Minimum: 2; Maximum: 30 characters.

Data Format: <First Name> as in <CC> to <CC.....CC> where "C" denotes a character.

Disposition: Mandatory for all accounts created on the ELD.

Example: [John], [Jean-Paul].

7.29 Geo-Location

Description: This data element is a descriptive indicator of the CMV position in terms of a distance and direction to a recognizable location derived from a database that contains all locations (cities, towns, villages, municipalities, etc.) listed in the latest Canadian Geo-Location database available on the CCMTA website and referenced in provision 6.

Purpose: Provide ELD users with recognizable location information on ELD display, printout and output document in PDF format.

Source: ELD internal calculations as specified in provision 4.4.2.

Used in: ELD display, printout and output document in PDF format.

Data Type: Identified from the underlying <Latitude> and <Longitude> data elements by the ELD.

Data Range: Contains four segments in one text field; a recognizable location driven from a database containing—at a minimum— all locations (listed in the Canadian Geo-Location database available on the CCMTA website) in text format containing a location name and the province or territory abbreviation, distance from this location and direction from this location.

Data Length: blank if underlying <Latitude> and <Longitude> data elements are not available, or Minimum: 5; Maximum: 60 characters.

Data Format: <Distance from {identified} Geo-location> <'km '> <Direction from {identified} Geo-location> <' '> <Place name of {identified} Geo-location> <' '> < province or territory abbreviation of {identified} Geo-Location> where:

- <Distance from {identified} Geo-location> must either be <{blank}> or <C> or <CC> or <CCC> where the up-to three-character number specifies absolute distance between identified geo-location and event location;
- <Direction from {identified} Geo-location> must either be <{blank}> or <C> or <CC> or <CCC>, must represent direction of event location with respect to the identified geo-location, and must take a value listed on Table 10;
- <Place name of {identified} Geo-location> must be the text description of the identified reference location;
- <Province or territory abbreviation of {identified} Geo-Location> must take values listed on Table 5.

Disposition: Mandatory when underlying <Latitude> and <Longitude> data elements are available.

Examples: [2 km ESE Toronto ON], [1 km SE Montreal QC], [11 km NNW Squamish BC].

7.30 Last Name

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

Purpose: Links an individual to the associated ELD account.

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

Used in: ELD account profile(s); ELD outputs (display and file).

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

Data Range: Any character combination (UTF-8).

Data Length: Minimum: 2; Maximum: 30 characters.

Data Format: <Last Name> as in <CC> to <CC.....CC>.

Disposition: Mandatory for all accounts created on the ELD.

Example: [Smith], [St-André], [Lee Jr].

7.31 Latitude

Description: This data element refers to an angular distance in degrees north and south of the equator.

Purpose: In combination with the <Longitude>, this data element stamps records requiring a position attribute with a reference point on the face of the earth.

Source: ELD's position measurement.

Used in: ELD events; ELD outputs.

Data Type: <Latitude> and <Longitude> must be automatically captured by the ELD.

Data Range: X, M, E or -90.00 to 90.00 in decimal degrees (two decimal point resolution) in records requiring positioning information; latitudes north of the equator must be specified by the absence of a minus sign (-) preceding the digits designating degrees; latitudes south of the Equator must be designated by a minus sign (-) preceding the digits designating degrees.

Data Length: 1, or 3 to 6 characters.

Data Format: <Latitude> as in <C> or first character: [<'-'> or <{blank}>]; then [<C> or <CC>]; then <'.'>; then [<CC>].

Disposition: Mandatory.

Examples: [X], [M], [E], [-15.68], [38.89], [5.07], [-6.11].

7.32 Line Data Check Value

Description: This data element refers to a hexadecimal “check” value calculated in accordance with procedure outlined in provision 4.4.5.2 and attached to each line of output featuring data at the time of ELD output file being generated.

Purpose: Provides ability to identify cases where an ELD output file may have been inappropriately modified after its original generation.

Source: ELD internal.

Used in: ELD output file.

Data Type: Calculated by the ELD in accordance with provision 4.4.5.2.

Data Range: A number between hexadecimal 00 (decimal 0) and hexadecimal FF (decimal 255).

Data Length: 2 characters.

Data Format: <Line Data Check Value> as in <CC>.

Disposition: Mandatory.

Examples: [01], [A4], [CC].

7.33 Longitude

Description: This data element refers to 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.

Purpose: In combination with the <Latitude>, this data element stamps records requiring a position attribute with a reference point on the face of the earth.

Source: ELD’s position measurement.

Used in: ELD events; ELD outputs.

Data Type: <Latitude> and <Longitude> must be automatically captured by the ELD.

Data Range: X, M, E or -179.99 to 180.00 in decimal degrees (two decimal point resolution) in records requiring positioning information; longitudes east of the prime meridian must be specified by the absence of a minus sign (-) preceding the digits designating degrees of longitude; longitudes west of the prime meridian must be designated by minus sign (-) preceding the digits designating degrees.

Data Length: 1, or 3 to 7 characters.

Data Format: <Longitude> as in <C> or first character: [<‘-’> or <{blank}>]; then [<C>, <CC> or <CCC>]; then <‘.’>; then [<CC>].

Disposition: Mandatory.

Examples: [X], [M], [E], [-157.81], [-77.03], [9.05], [-0.15].

7.34 Malfunction and Diagnostic Code

Description: This data element refers to a code that further specifies the underlying malfunction or data diagnostic event.

Purpose: Enables coding the type of malfunction and data diagnostic event to cover the standardized set in Table 4.

Source: ELD internal monitoring.

Used in: ELD events; ELD outputs.

Data Type: Recorded by ELD when malfunction and data diagnostic events are set or cleared.

Data Range: As specified in Table 4.

Data Length: 1 character.

Data Format: <Malfunction or Diagnostic Code> as in <C>.

Disposition: Mandatory.

Examples: [1], [5], [P], [L].

7.35 Malfunction Indicator Status

Description: This data element is a Boolean indicator identifying whether the used ELD unit has an active malfunction set at the time of event recording.

Purpose: Documents the snapshot of ELD's malfunction status at the time of an event recording.

Source: ELD internal monitoring functions.

Used in: ELD events; ELD outputs.

Data Type: Internally monitored and managed.

Data Range: 0 (no active malfunction) or 1 (at least one active malfunction).

Data Length: 1 character.

Data Format: <Malfunction Indicator Status> as in <C>.

Disposition: Mandatory.

Examples: [0] or [1].

7.36 Cycle Used

Description: This data element 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 HOS regulations accordingly.

Source: Motor carrier or driver.

Used in: ELD account profile; ELD outputs, ELD events.

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.

Data Range: 7 or 14

Data Length: 2 characters.

Data Format: <Cycle Used> as in <CC>.

Disposition: Mandatory.

Examples: [7], [14].

7.37 Order Number

Description: This data element is a continuous integer number assigned in the forming of a list, starting at 1 and incremented by 1 for each unique item on the list.

Purpose: Allows for more compact report file output generation avoiding repetitious use of CMV identifiers and usernames affected in records.

Source: ELD internal.

Used in: ELD outputs, listing of users and CMVs referenced in ELD RODS.

Data Type: Managed by ELD.

Data Range: Integer between 1 and 99.

Data Length: 1–2 characters.

Data Format: <Order Number> as in <C> or <CC>.

Disposition: Mandatory.

Examples: [1], [5], [11], [28].

7.38 Output File Comment

Description: This is a textual data element 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> 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.

Source: Enforcement personnel or driver or motor carrier.

Used in: ELD outputs.

Data Type: If provided, the <Output File Comment> is entered or appended to the ELD dataset prior to submission of ELD data to enforcement.

Data Range: Blank or any alphanumeric combination specified and provided by an authorized safety official.

Data Length: 0–60 characters.

Data Format: <Output File Comment>, either <{blank}>, or <C> thru <CCCC.....CCCC>.

Disposition: Mandatory.

Examples: [], [3BHG701015], [113G1EFW02], [7353930].

7.39 [RESERVED]

7.40 Time

Description: In combination with the <Date>, this data element stamps 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 provision 4.4.3.

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

Source: ELD's converted time measurement.

Used in: ELD events; ELD outputs.

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

Data Range: Any valid date combination expressed in <HHMMSS> format where <HH> must be between 00 and 23, <MM> and <SS> must be between 00 and 59.

Data Length: 6 characters.

Data Format: <Time> as in <HHMMSS> where "HH" refers to hours of the day, "MM" refers to minutes, and "SS" refers to seconds.

Disposition: Mandatory.

Examples: [070111], [001259], [151522], [230945].

7.41 Time Zone Offset from UTC

Description: This data element 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> parameter by the motor carrier or the driver, or tracked automatically by ELD.

Used in: ELD account profile; ELD event: Driver's certification of own RODS.

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.

Data Range: Any valid date combination expressed in <HHMM> format where <HH> must be between 03 and 08, and <MM> must be 00 or 30.

Data Length: 4 characters.

Data Format: <Time Zone Offset from UTC> as in <HHMM> where "HH" and "MM" refer to hours and minutes in difference; omit sign.

Disposition: Mandatory.

Examples: [0400], [0500], [0330].

7.42 Trailer Number(s)

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

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

Source: Unique trailer identifiers a motor carrier uses in their normal course of business and includes on dispatch documents, or the licence number followed by the licencing jurisdiction of each towed unit; The <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.

Data Range: Any alphanumeric combination.

Data Length: Minimum: blank; Maximum: 32 characters (3 trailer numbers each maximum 10 characters long, separated by spaces).

Data Format: <Trailer Number(s)> as in <{blank}> to <CCCCCCCCCC CCCCCCCCCC CCCCCCCCCC>. Data element to be left "blank" for non-combination vehicles (such as a straight truck or bobtail tractor). Each trailer identifier must be separated by a space in case of multiple trailers hauled at one time, as in <Trailer Number(s) {#1}> <' '> <Trailer Number(s) {#2}> <' '> <Trailer Number(s) {#3}>.

Disposition: Mandatory when operating combination vehicles.

Examples: [987], [00987 PP2345], [BX987 POP712 10567], [TX12345 LA22A21], [T987654ON T12345ON].

7.43 Vehicle Distance

Description: This data element refers to the distance traveled using the CMV in whole kilometers. It 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. It is also used to calculate <{Driven} Vehicle Distance>, which refers to the cumulative distance for each driver while driving each vehicle.

Purpose: Accumulated Vehicle Distance provides ability to track distance traveled while driving the CMV in each duty status. Total Vehicle Distance at the start and end of the day is also required in current HOS Regulations. Driven Vehicle Distance also provides ability to track the distance accumulated by each driver while driving the vehicle. Makes ELD RODS consistent with current HOS regulations requirements.

Source: ELD measurement or sensing.

Used in: ELD events; ELD outputs.

Data Type: Acquired from the engine ECM or a comparable other source as allowed in provision 4.3.1.3.

Data Range: For <{Total} Vehicle Distance>, range is between 0 and 9 999 999; for <{Accumulated} Vehicle Distance > and <{Driven} Vehicle Distance>, range is between 0 and 9 999.

Data Length: 1–7 characters.

Data Format: <Vehicle Distance> as in <C> to <CCCCCCC>.

Disposition: Mandatory.

Examples: [99], [1004566], [0], [422].

7.44 Off-Duty Time Deferral Status

Description: This data element states that the driver is deferring Off-Duty time and clearly indicates whether the driver is driving under “Day 1” or “Day 2” of that time.

Purpose: Identifies the “Day 1” or “Day 2” of the work day for the driver; makes ELD RODS consistent with current HOS regulations requirements.

Source: ELD internal monitoring functions.

Used in: ELD events; ELD outputs.

Data Type: internally monitored and managed.

Data Range: 0 (none) or 1 (Day 1) or 2 (Day 2), as described on Table 6.

Data Length: 1 character.

Data Format: <Off-Duty Time Deferral Status> as in <C>.

Disposition: Mandatory.

Examples: [0], [1], [2].

7.45 Off-Duty Time Deferred

Description: This data element refers to the Off-Duty time deferred by the driver.

Purpose: Identifies the Off-Duty time deferred from “Day 1” to “Day 2” by the driver; makes ELD RODS consistent with current HOS regulations requirements.

Source: driver, motor carrier or ELD.

Used in: ELD events; ELD outputs.

Data Type: automatically calculated by the ELD and can be updated by the driver or the motor carrier to reflect true and accurate information for the driver.

Data Range: Any time allowed under current HOS regulations and expressed in <HHMM> format where “HH” refers to hours and “MM” refers to minutes.

Data Length: 4 characters.

Data Format: <Off-Duty Time Deferred> as in <HHMM> where <HH> must be between 00 and 02, <MM> must be between 00 and 59.

Disposition: Mandatory.

Examples: [0030], [0130], [0200].

7.46 Operating Zone

Description: This data element refers to the operating zone (south or north of latitude 60°N) used to compute cumulative duty hours.

Purpose: Provides ability to apply the current HOS regulations accordingly.

Source: motor carrier or driver.

Used in: ELD outputs, ELD events.

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

Data Range: 1 (south of latitude 60°N in Canada) or 2 (north of latitude 60°N in Canada) or 3 (Outside of Canada).

Data Length: 1 character.

Data Format: <Operating Zone> as in <C>.

Disposition: Mandatory.

Examples: [1], [2], [3].

7.47 [RESERVED]

7.48 Motor Carrier's Address

Description: This data element refers to the motor carrier's addresses. It 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 current HOS regulations requirements.

Source: Motor carrier or driver.

Used in: ELD account profile, ELD outputs.

Data Type: Programmed or entered by the motor carrier during account creation, and updated to reflect true and accurate information for the driver. A driver may update the <{Home Terminal} Address>.

Data Range: For <{Home Terminal} Address> and <{Principal place of Business} Address>, any character combination (UTF-8).

Data Length: 30-60 characters.

Data Format: <Address> as in < CCCC. . . . . .CCCC >.

Disposition: Mandatory.

Example: [1234 Industrial St., Montreal, QC, H1C 1M1].

7.49 Hours in Work shift or Cycle

Description: This data element refers to the elapsed time in the most recent work shift or the time cumulated in the cycle used by the authenticated driver. It is a placeholder for <{Total} Hours in work shift>, which refers to the elapsed time since the beginning of the most recent work shift, for <{Total} Hours in cycle>, which refers to the time cumulated, as described in the current HOS Regulations, for the cycle used by the authenticated driver, and also for <{Remaining} Hours in cycle>, which refers to the hours available for the cycle used by the authenticated driver.

Purpose: Allows the driver to keep track of his available hours with regards to On-Duty-/Driving-hour limitations specified in current HOS regulations.

Source: ELD internal calculations for requirements specified in provision 4.4.6.

Used in: ELD outputs.

Data Type: internally monitored and managed.

Data Range: For <{Total} Hours in work shift>, range is between 00:00 and 23:59; for <{Total} Hours in cycle> and <{Remaining} Hours in cycle>, range is between 000:00 and 336:00, first three digits 000 to 336 and last two digits 00 to 59.

Data Length: 4 to 5 characters.

Data Format: <{Total} Hours in work shift> as in <HHMM> where "HH" and "MM" refer to hours and minutes; <{Total} Hours in cycle> and <{Remaining} Hours in cycle> as in <HHH:MM> where "HHH" refers to hours and "MM" refers to minutes.

Disposition: Mandatory.

Examples: [0701], [0059], [1515], [33600].

7.50 Total Hours

Description: This data element refers to the time cumulated for the authenticated driver. It is a placeholder for <Total Hours {in working day so far}>, which refers to the elapsed time since the beginning of the day for the driver, and for <Total Hours {in each duty status}>, which refers to the time cumulated, as described in the current HOS Regulations, for each duty status used by the authenticated driver.

Purpose: Allows the driver to keep track of his available hours with regards to On-Duty-/Driving-hour limitations specified in current HOS regulations.

Source: ELD internal calculations for requirements specified in provision 4.4.6.

Used in: ELD outputs.

Data Type: internally monitored and managed.

Data Range: <Total Hours {in working day so far}> and <Total Hours {in each duty status}>, range is between 00:00 and 24:00, first two digits from 00 to 24 and last two digits from 00 to 59. Range upper limit for <Total Hours {in working day so far}> may be greater than 24:00 for a specific day when the parameter <Time Zone Offset from UTC> is changed during the day, either for daylight savings time changes or changes in time Standard in effect at driver's home terminal (event type 24).

Data Length: 4 characters.

Data Format: <Total Hours> as in <HHMM> where "HH" and "MM" refer to hours and minutes.

Disposition: Mandatory.

Examples: [0000], [0832], [1545], [2400].

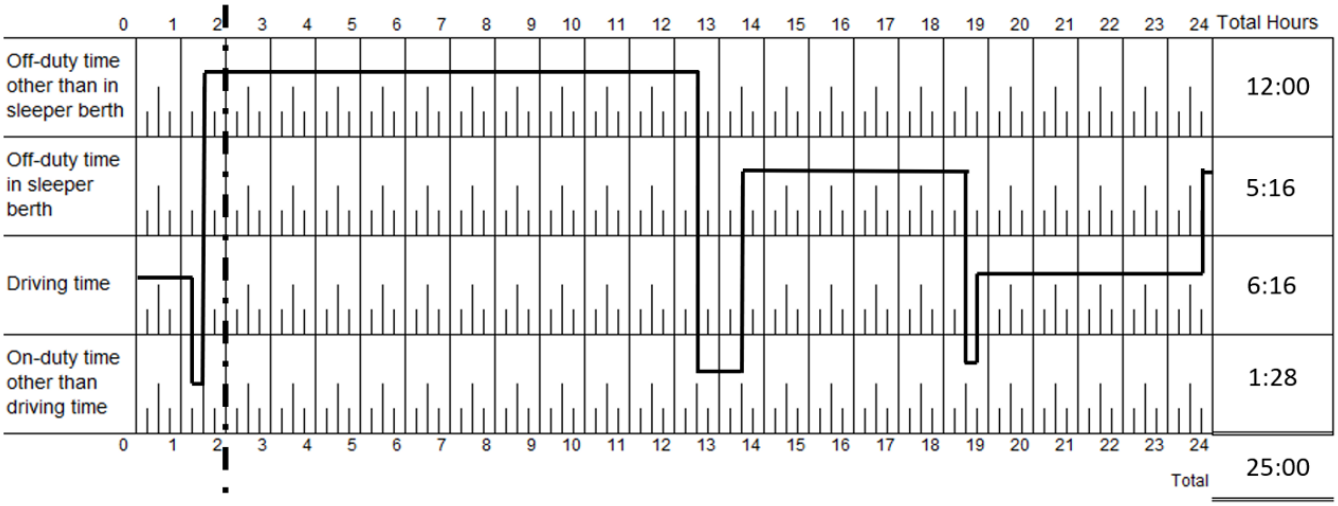
Schedule 1: RODS in PDF and printout format (Fall time change)

Section 1 Header

Date of RODS (MM-DD-YY)	Day Start Time (HH:MM:SS)	UTC Time zone offset (HH:MM)	Current Location (Geo-location, Lat., Long.)		Output file comment	Current date and time (MM-DD-YY, HH:MM:SS)
11-05-23	00:00:00	05:00	Lancaster On, inspection station, 45.15, -74.49		Officer W.J. Thompson, ID 516212	11-09-23, 10:26:21
Driver name (Last, First)	Driver ID (Username)	Exempt driver status (E: exempt, 0: No)	Driver Licence (No and Jurisdiction)		Co-Driver Name (Last, First)	Co-Driver ID (Username)
Smith, Richard	SR1213456	0	SMIR12345601 QC		Morneau, Guy	MG1213565
Power unit number (ID or Licence No & Jurisdiction)	VIN (Power unit)	Total vehicle distance (Start-End of day)	Distance today (km)	Current Total distance (km)	Current Total engine hours (hours)	Trailer number (ID or Licence No & Jurisdiction)
1) L123456Qc 2) PR0987On	1)1M2P267YSAM022445 2)-1FUJGHDV 0CLBP 8896	1) 346470-346573 2) 204885-205829	103 519	208998	3265.4	R956471Qc T987654On T12345On
Carrier Name	Home terminal (address)			Principal Place of Business (address)		
Consolidated Truckload inc	4545 AV Pierre de Coubertin Montréal, Qc H1V0B2			4545 AV Pierre de Coubertin Montréal, Qc H1V0B2		
Operating Zone (1, 2 or 3)	Cycle (1:7 days or 2:14 days)	Total hours (in work shift)	Total Hours (in cycle)	Remaining Hours (in cycle)	Off-Duty Time Deferral (Status: None, Day 1, Day 2 Time deferred: (HH:MM)	
1	1	11:14	63:29	6:31	Day 2 (01:30)	

Data Diagnostic (Status & active Code)	Unidentified driver records (0: none, 1: active)	Malfunction (Status & active Code)	ELD Identifier	ELD Provider	ELD Certification Number
Status 1 (Code 3, 4)	1	Status 0	1001ZE	ELD provider Inc.	ZA10

HOS Graph-grid



Section 2: Changes in driver's Duty Status, Intermediate Logs and Special Driving Conditions (Ferry, Personal Use and Yard Moves)

Date & time (MM-DD-YY) (HH:MM:SS)	Event	Geo-Location	Lat., Long.		Dist. last val. coord.	Power unit	Acc. Dist. (km)	Elapsed Hours (hours)	Total Dist. (km)	Record Status	Record Origin	DD status	Malf. status	Seq. ID
11-05-23														
00:51:50	INT	2 km SSE Laval QC	45.57	-73.74	0	L123456Qc	126	1.3		1	1	0	0	3AD6
01:15:16	ON	9 km NE Montréal QC	45.56	-73.55	0	L123456Qc	167	1.7		1	2	0	0	3AD7
01:30:26	OFF	9 km NE Montréal QC	45.56	-73.55	0	L123456Qc	167	2.0		1	2	0	0	3AD9
01:40:28	PC on		45.59	-73.61	0	L123456Qc	0	0	346522	1	2	0	0	3ADB
12:30:02	Sdc off		45.59	-73.61	0	L123456Qc	25	0.5	346571	1	2	0	0	3ADC
12:30:47	D	9 km NE Montréal QC	45.56	-73.55	0	L123456Qc	25	0.5		2	1	0	0	3ADD
12:30:47	ON	9 km NE Montréal QC	45.55	-73.55	0	L123456Qc	25	0.5		1	3	0	0	91F
12:30:47	YM on	9 km NE Montréal QC	45.55	-73.55	0	L123456Qc	25	0.5	346571	1	3	0	0	920
13:28:00	ON	9 km NE Montréal QC	45.55	-73.55	0	L123456Qc	27	1.5	346573	2	2	0	0	3ADE
13:28:00	Sdc off	9 km NE Montréal QC	45.55	-73.55	0	L123456Qc	27	1.5	346573	1	3	0	0	921

Section 2: Changes in driver's Duty Status, Intermediate Logs and Special Driving Conditions (Ferry, Personal Use and Yard Moves)														
Date & time (MM-DD-YY) (HH:MM:SS)	Event	Geo-Location	Lat., Long.		Dist. last val. coord.	Power unit	Acc. Dist. (km)	Elapsed Hours (hours)	Total Dist. (km)	Record Status	Record Origin	DD status	Malf. status	Seq. ID
13:28:57	D	9 km NE Montréal QC	45.55	-73.55	0	PR0987On	3	0.2		1	1	0	0	B1F3
14:15:41	INT	3 km NNE km St-Hyacinthe QC	45.41	-73.94	0	PR0987On	55	0.9		1	1	0	0	B1F4
15:15:41	INT	3 km NE St-Louis-de-Blandford QC	46.28	-71.99	0	PR0987On	160	1.9		1	1	0	0	B1F5
16:15:41	INT	5 km E Lévis Qc	46.80	-71.12	0	PR0987On	250	2.9		1	1	0	0	B1F6
17:15:41	INT	6 km WSW La Pocatière QC	47.36	-70.07	0	PR0987On	355	3.9		1	1	0	0	B1F7
18:29:07	ON	St Antonin Big stop HW 85 QC	M	M	9	PR0987On	430	4.6		1	2	0	0	B1F8
18:44:26	D		X	X	9	PR0987On	0	0.1		2	1	0	0	B1FB
18:44:26	D	St Antonin Big stop HW 85 QC	M	M	9	PR0987On	0	0.1		1	2	0	0	B204
19:44:26	INT		E	E	9	PR0987On	91	1.1		1	1	1	1	B1FE
20:44:26	INT	5 km N. Perth Andover NB	46.77	-67.73	0	PR0987On	199	2.1		1	1	1	0	B200
21:44:26	INT	12 km ESE Nackawic NB	45.95	-67.37	0	PR0987On	308	3.1		1	1	1	0	B201
22:44:26	INT	8 km NW Gagetown NB	45.83	-66.22	0	PR0987On	415	4.1		1	1	1	0	B202
23:44:12	SB	3 km NNW Salisbury NB	46.01	-65.06	0	PR0987On	519	5.1		1	1	1	0	B205

Section 3: Login/Logout, Certification of RODS, Data Diagnostics and Malfunctions, Co-driver identification						
Date & time (MM-DD-YY) (HH:MM:SS)	Event	Additional information	Power unit	Total Dist. (km)	Total Hours (hours)	Seq. ID
11-05-23						
13:28:03	Logout		L123456Qc	346573	4093.7	3ADF
13:28:48	Login		PR0987On	204885	3228.3	B1F1
13:28:53	Co-driver in	Morneau, Guy (MG1213565)	PR0987On	204885	3228.3	B1F2
18:44:27	Diagnostic on	3: Missing data elements	PR0987On	205320	3333.1	B1FC
18:50:08	Malfunction on	L: Positioning	PR0987On	205329	3333.2	B1FD
19:50:51	Malfunction off	L: Positioning	PR0987On	205402	3334.1	B1FF
23:00:19	Diagnostic on	4: Data transfer	PR0987On	205756	3336.9	B203
23:44:40	RODS Cert	Home terminal time zone: 05:00	PR0987On			B206
11-06-24						
23:30:02	RODS Cert 1	Home terminal time zone: 05:00	PR0987On			F7DB

Section 4: Change in Driver's cycle, Change in Operating Zone, Off-Duty Time Deferral, Change in Time standard									
Date & time (MM-DD-YY) (HH:MM:SS)	Event	Additional information or Geo-Location	Lat., Long.		Distance last val. coord.	Power unit	Record Status	Record Origin	Seq. ID
11-05-23									
01:18:04	Day 2	Time deferred: 1:30				L123456Qc	1	2	3ADA
02:00:01	Time Zone	Home terminal new time zone: 05:00					1	1	34CE

Section 5: Annotations						
Event Date (MM-DD-YY)	Event Time (HH:MM:SS)	Event Seq. ID	Annotation	Ann. Date (MM-DD-YY)	Ann. Time (HH:MM:SS)	Originator (username)
11-05-23	01:40:28	3ADB	Car would not start, used the truck to go home	11-05-23	01:40:39	SR1213456
11-05-23	12:30:02	3ADC	Back to the shop	11-05-23	12:30:18	SR1213456
11-05-23	12:30:47	3ADD	You are allowed to record YM when shunting trailers	11-06-24	14:10:56	Office654
11-05-23	18:44:26	B204	Same location as when I stopped	11-05-23	23:44:12	SR1213456

Section 6: Additional Hours							
Date (MM-DD-YY)	On-Duty time (HH:MM)	Off-Duty time (HH:MM)	Beginning of Work shift (HH:MM)	End of Work shift (HH:MM)	Record Status	Record Origin	Seq. ID
11-05-23 This section is empty – no event record to report							

Section 7: Engine Power up and Shut Down										
Date & time (MM-DD-YY) (HH:MM:SS)	Event	Geo-Location	Lat., Long.		Distance last val. coord.	Power unit	Trailer	Total Dist. (km)	Total Hours (hours)	Seq. ID
11-05-23										
01:15:17	Shut Down	9 km NE Montréal QC	45.56	-73.55	0	L123456Qc	R956471Qc	346522	4092.4	3AD8
13:28:01	Shut Down	9 km NE Montréal QC	45.56	-73.55	0	L123456Qc		346573	4093.7	3ADF
18:29:07	Shut Down		X	X	9	PR0987On	T987654On T12345On	205320	3333.0	B1F9
18:38:16	Power Up		X	X	9	PR0987On	T987654On T12345On	205320	3333.0	B1FA

Unidentified driver

Section 2: Changes in driver's Duty Status, Intermediate Logs and Special Driving Conditions (Ferry, Personal Use and Yard Moves)														
Date & time (MM-DD-YY) (HH:MM:SS)	Event	Geo-Location	Lat., Long.		Dist. last val. coord.	Power unit	Acc. Dist. (km)	Elapsed Hours (hours)	Total Dist. (km)	Record Status	Record Origin	DD status	Malf. status	Seq. ID
11-05-23														
10:05:48	DR	9 km NE Montréal QC	45.56	-73.55	0	PR 0987	0	0	204882	1	1	0	0	B1E8
11:34:51	ON	9 km NE Montréal QC	45.56	-73.55	0	PR 0987	1	0.1	204883	1	1	0	0	B1EA
11:14:46	DR	9 km NE Montréal QC	45.56	-73.55	0	PR 0987	0	0	204883	1	1	0	0	B1EC
11:19:01	ON	9 km NE Montréal QC	45.56	-73.55	0	PR 0987	1	0.1	204884	1	1	1	0	B1EF

Section 3: Login/Logout, Certification of RODS, Data Diagnostics and Malfunctions, Co-driver identification						
Date & time (MM-DD-YY) (HH:MM:SS)	Event	Additional information	Power unit	Total Dist. (km)	Total Hours (hours)	Seq. ID
11-05-23						
11:18:56	Diagnostic on	5: Unidentified driving records	PR0987On	204884	3228.2	B1ED

Section 4: Change in Driver's cycle, Change in Operating Zone, Off-Duty Time Deferral, Change in Time standard									
Date & time (MM-DD-YY) (HH:MM:SS)	Event	Additional Information	Geo-Location	Lat., Long.	Distance last val. coord.	Power unit	Record Status	Record Origin	Seq. ID
11-05-23	This section is empty – no event record to report								

Section 5: Annotations						
Date (MM-DD-YY)	Time (HH:MM:SS)	Seq. ID	Annotation	Ann. Date (MM-DD-YY)	Ann. Time (HH:MM:SS)	Originator (username)
11-05-23	10:05:48	B1E8	Driving time belongs to new truck washer. No authentication number yet	11-06-24	09:55:25	Office234
11-05-23	11:14:46	B1EC	Driving time belongs to new truck washer. No authentication number yet	11-06-24	09:55:49	Office234

Section 6: Additional Hours							
Date (MM-DD-YY)	On-Duty time (HH:MM)	Off-Duty time (HH:MM)	Beginning of Work shift (HH:MM)	End of Work shift (HH:MM)	Record Status	Record Origin	Seq. ID
11-05-23 This section is empty – no event record to report							

Section 7: Engine Power up and Shut Down										
Date & time (MM-DD-YY) (HH:MM:SS)	Event	Geo-Location	Lat., Long.		Distance last val. coord.	Power unit	Trailer	Total Dist. (km)	Total Hours (hours)	Seq. ID
11-05-23										
10:04:34	Power Up	9 km NE Montréal QC	45.56	-73.55	0	PR0987On		204882	3227.6	B1E7
11:34:50	Shut Down	9 km NE Montréal QC	45.56	-73.55	0	PR0987On		204883	3228.1	B1E9
11:14:09	Power Up	9 km NE Montréal QC	45.56	-73.55	0	PR0987On		204883	3228.1	B1EB
11:19:00	Shut Down	9 km NE Montréal QC	45.56	-73.55	0	PR0987On		204884	3228.2	B1EE

Schedule 2: Tables

Table 1 Duty status categories		
Duty status	**Abbreviation**	**Data coding**
Off-Duty	OFF	1
Sleeper berth	SB	2
Driving	D	3
On-Duty not driving	ON	4

Table 2 Categories for driver's indication of situations impacting driving time recording		
Category	**Abbreviation**	**Data coding**
Authorized personal use of CMV	PC	1
Yard moves	YM	2
Ferry provision	FY	3
Default: none		0

Table 3

Character to Decimal Value Mapping for Checksum Calculations

Character	Decimal mapping	Character	Decimal mapping
0	0	a	49
1	1	b	50
2	2	c	51
3	3	d	52
4	4	e	53
5	5	f	54
6	6	g	55
7	7	h	56
8	8	i	57
9	9	j	58
A	17	k	59
B	18	l	60
C	19	m	61
D	20	n	62
E	21	o	63
F	22	p	64
G	23	q	65
H	24	r	66
I	25	s	67
J	26	t	68
K	27	u	69
L	28	v	70
M	29	w	71
N	30	x	72
O	31	y	73
P	32	z	74
Q	33	All other characters including blank spaces	0
R	34		
S	35		
T	36		
U	37		
V	38		
W	39		
X	40		
Y	41		
Z	42		

Table 4 Standard coding for required compliance Malfunction and Data diagnostic event detection		
Malfunction and Data Diagnostic code	**Description**	**Abbreviation**
P	Power compliance malfunction	P: Power
E	Engine synchronization compliance malfunction	E: Engine synchronization
T	Timing compliance malfunction	T: Timing
L	Positioning compliance malfunction	L: Positioning
R	Data recording compliance malfunction	R: Data recording
S	Data transfer compliance malfunction	S: Data transfer
O	Other ELD detected malfunction	O: Other
1	Power data diagnostic event	1: Power
2	Engine synchronization data diagnostic event	2: Engine synchronization
3	Missing required data elements data diagnostic event	3: Missing data elements
4	Data transfer data diagnostic event	4: Data transfer
5	Unidentified driving records data diagnostic event	5: Unidentified driving records
6	Other ELD detected data diagnostic event	6: Other

Table 5 Abbreviation codes for provinces, territories, and states	
Canada	
Code	**Province or Territory**
AB	Alberta
BC	British Columbia
MB	Manitoba
NB	New Brunswick
NL	Newfoundland and Labrador
NS	Nova Scotia
NT	Northwest Territories
NU	Nunavut
ON	Ontario
PE	Prince Edward Island
QC	Québec
SK	Saskatchewan
YT	Yukon

Table 5 Abbreviation codes for provinces, territories, and states			
U.S.A.			
Code	**State**	**Code**	**State**
AL	Alabama	MT	Montana
AK	Alaska	NC	North Carolina
AR	Arkansas	ND	North Dakota
AZ	Arizona	NE	Nebraska
CA	California	NH	New Hampshire
CO	Colorado	NJ	New Jersey
CT	Connecticut	NM	New Mexico
DC	District of Columbia	NV	Nevada
DE	Delaware	NY	New York
FL	Florida	OH	Ohio
GA	Georgia	OK	Oklahoma
HI	Hawaii	OR	Oregon
IA	Iowa	PA	Pennsylvania
ID	Idaho	RI	Rhode Island
IL	Illinois	SC	South Carolina
IN	Indiana	SD	South Dakota
KS	Kansas	TN	Tennessee
KY	Kentucky	TX	Texas
LA	Louisiana	UT	Utah
MA	Massachusetts	VA	Virginia
MD	Maryland	VT	Vermont
ME	Maine	WA	Washington
MI	Michigan	WI	Wisconsin
MN	Minnesota	WV	West Virginia
MO	Missouri	WY	Wyoming
MS	Mississippi		

Table 5 Abbreviation codes for provinces, territories, and states			
Mexico			
Code	**State**	**Code**	**State**
AGU	Aguascalientes	MEX	México
BCN	Baja California	NAY	Nayarit
BCS	Baja California Sur	NLE	Nuevo León
CAM	Campeche	OAX	Oaxaca
CHP	Chiapas	PUE	Puebla
CHH	Chihuahua	QUE	Querétaro
CMX	Ciudad de México	ROO	Quintana Roo
COA	Coahuila	SLP	San Luis Potosí
COL	Colima	SIN	Sinaloa
DUR	Durango	SON	Sonora
GUA	Guanajuato	TAB	Tabasco
GRO	Guerrero	TAM	Tamaulipas
HID	Hidalgo	TLA	Tlaxcala
JAL	Jalisco	VER	Veracruz
MIC	Michoacán	YUC	Yucatán
MOR	Morelos	ZAC	Zacatecas
Other			
Code	**Province, State or Country**		
OT	All others not covered above		

Table 6 “Event Type" Parameter Coding			
Event Type	**Event Code**	**Event Code description**	**Abbreviation**
1	1	Driver's duty status changed to "Off-Duty"	Off
1	2	Driver's duty status changed to "Sleeper berth"	SB
1	3	Driver's duty status changed to "Driving"	D
1	4	Driver's duty status changed to "On-Duty not driving"	ON
2	1	Intermediate log with conventional location precision	INT
2	2	Intermediate log with reduced location precision	INT R
3	1	Driver indicates "Authorized Personal Use of CMV"	PC on
3	2	Driver indicates "Yard Moves"	YM on
3	3	Driver indicates "Ferry Provision"	FY on
3	0	Driver indicates end of “Special Driving Condition” (Ferry Provision, Personal Use or Yard Moves)	SDC off
4	1	Driver's first certification of a RODS	RODS Cert
4	n	Driver's 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.	RODS Cert n
5	1	Authenticated driver's ELD authentication activity (login)	Login
5	2	Authenticated driver's ELD authentication activity (logout)	Logout
6	1	Engine power-up with conventional location precision	Power up
6	2	Engine power-up with reduced location precision	Power up R
6	3	Engine shut down with conventional location precision	Shut Down
6	4	Engine shut down with reduced location precision	Shut Down R
7	1	ELD malfunction is set	Malfunction on
7	2	ELD malfunction is cleared	Malfunction off
7	3	Data Diagnostic event is set	Diagnostic on
7	4	Data Diagnostic event is cleared	Diagnostic off
20	0	Off-duty time deferral set to "none"	Deferral off
20	1	Off-duty time deferral set to "Day 1"	Day 1
20	2	Off-duty time deferral set to "Day 2"	Day 2
21	1	Cycle set to "Cycle 1"	Cycle 1
21	2	Cycle set to "Cycle 2"	Cycle 2
22	1	Operating zone set to "south of latitude 60°N in Canada"	1: Canada S.
22	2	Operating zone set to "north of latitude 60°N in Canada"	2: Canada N.
22	3	Operating zone set to "Outside of Canada"	3: Foreign
23	1	Additional hours	
24	1	Time Standard change at Driver’s Home Terminal	Time zone
25	1	Addition of Co-Driver Identification	Co-Driver in
25	2	Co-Driver Identification delete	Co-Driver out

Table 7 "Event Record Origin" Parameter Coding	
Event record origin	**Event record origin code**
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
Additional hours recorded for another motor carrier or ELD system	5

Table 8 "Event Record Status" Parameter Coding	
Event record status	**Event record status code**
Active	1
Inactive - Changed	2
Inactive - Change Requested	3
Inactive - Change Rejected	4

Table 9 "Event type" Parameter Coding	
Event type	**Event type code**
A change in driver's duty status	1
An intermediate log	2
A change in driver's indication of ferry provision, authorized personal use of CMV or yard moves	3
A driver's certification/re-certification of RODS	4
A driver's ELD authentication activity (login/logout)	5
A CMV's engine power up/shut down activity	6
An ELD malfunction or data diagnostic (set/cleared)	7
Off-duty time deferral	20
A change in driver's cycle	21
A change in operating zone	22
Additional hours	23
A change in time standard at driver's home terminal	24
A change in co-driver's identification	25

Table 10 Conventional compass rose direction coding to be used in the Geo-Location parameter.	
Direction	**Direction code**
At indicated geo-location	{blank}
North of indicated geo-location	N
North-North-East of indicated geo-location	NNE
North-East of indicated geo-location	NE
East-North-East of indicated geo-location	ENE
East of indicated geo-location	E
East-South-East of indicated geo-location	ESE
South-East of indicated geo-location	SE
South-South-East of indicated geo-location	SSE
South of indicated geo-location	S
South-South-West of indicated geo-location	SSW
South-West of indicated geo-location	SW
West-South-West of indicated geo-location	WSW
West of indicated geo-location	W
West-North-West of indicated geo-location	WNW
North-West of indicated geo-location	NW
North-North-West of indicated geo-location	NNW