Rhode Island State Police

Collision Reconstruction Unit Report

APPENDIX A

Rhode Island Crime Lab Report

RI STATE CRIME LABORATORY

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LAB CASE NUMBER: **20-622 Report 1**
AGENCY: **Rhode Island State Police**
311 Danielson Pike
North Scituate, RI 02857

AGENCY CASE NUMBER: **20RIX1-1452-OF**

RELATED CASE NUMBER(S): **FSU 20-235**

TRACE EVIDENCE EXAMINATION

November 5, 2020

REPORT TO: Det. Adrian Cybowicz

EVIDENCE RECEIVED:

Item #	Dept. Item #	Description
1	20RIX1-2988-PR	Traffic sign - red stop sign submitted on 10/20/2020
2	20RIX1-2989-PR	Black helmet submitted on 10/20/2020
3	20RIX1-2990-PR	Black sweatshirt submitted on 10/20/2020

ANALYSIS REQUESTED:
Trace evidence examination
Polymer examination
Fiber examination

ANALYSIS PERFORMED AND RESULTS:
Gross Description of Items
Item 1 contains of one damaged "STOP" sign.

Item 2 contains one damaged black helmet.

Item 3 contains one damaged Gildan brand, size XL black hooded sweatshirt.

All items were examined grossly, microscopically and/or chemically using the Stereomicroscope, Polarized Light Microscope, Comparison Microscope and the Fourier Transform Infrared Microscope.

Trace evidence examination
Item 1 (stop sign) was examined and was noted to have several areas with red exemplar coating removed or scraped. Item 1 (stop sign) was also noted to have damage located on some of the

graffiti type white lettering noted in the lower portion of the stop sign. Within those areas of damage several fragmented fiber-like artifacts ranging from gray to dark gray in color were detected. The fiber-like fragmented artifacts were collected and subsequently labeled as Item 1.1.

An exemplar sample of the stop sign was collected and was subsequently labeled as Item 1.2. The following layer sequence was noted within the construction of the stop sign: red polymer coating, cloudy polymer coating, clear polymer coating shaped in a pyramid type design, clear polymer coating, white polymer coating and an adhesive type backing.

Item 2 (helmet) was examined and noted to have several areas with an unknown red transfer. Trace evidence was collected from the packaging (paper bag contained inside of the box) and was subsequently labeled as Item 2.1. Item 2.1 was examined microscopically and was found to contain miscellaneous debris, fiber-like artifacts and red polymer-like artifacts. The red polymer-like artifacts were too limited in quality and quantity for any further analysis. No further analysis was conducted on Item 2.1 (trace recovered).

Item 3 (sweatshirt) was examined and noted to have several areas with an unknown red transfer, unknown red/white transfer, unknown clear transfer and unknown white transfer.

Trace evidence was collected from Item 3 and was subsequently labeled as Item 3.1. Item 3.1 was examined microscopically and was found to contain miscellaneous debris, fiber-like artifacts, vegetation, hair-like artifacts, road debris and polymer-like artifacts. One unknown clear/white polymer-like fragment was selected from Item 3.1 (trace recovered) for further analysis.

Exemplar black fibers were collected from Item 3 (sweatshirt) and were subsequently labeled as Item 3.2.

Polymer Examination

Item 1 (stop sign) exemplar red polymer coating vs. Item 2 (helmet) unknown red transfer

The unknown red transfer noted on Item 2 (helmet) was compared to the exemplar red polymer coating from Item 1 (stop sign).

The comparison between the unknown red transfer on Item 2 (helmet) and the exemplar red polymer coating on Item 1 (stop sign) revealed similar class characteristics, including physical and chemical properties.

Item 1 (stop sign) exemplar red polymer coating vs. Item 3 (sweatshirt) unknown red transfer

The unknown red transfer noted on Item 3 (sweatshirt) was compared to the exemplar red polymer coating from Item 1 (stop sign).

The comparison between the unknown red transfer on Item 3 (sweatshirt) and the exemplar red polymer coating on Item 1 (stop sign) revealed similar class characteristics, including physical and chemical properties.

Item 1 (stop sign) unknown red/white damage from graffiti type lettering vs. Item 3 (sweatshirt) unknown red/white transfer

The unknown red /white transfer noted on Item 3 (sweatshirt) was compared to the unknown red/ white damage noted on the graffiti type lettering on the bottom of Item 1 (stop sign).

The comparison between the unknown red /white transfer on Item 3 (sweatshirt) and the unknown red/ white damage noted on the graffiti type lettering on the bottom of Item 1 (stop sign) revealed similar class characteristics, including physical and chemical properties.

Item 1 (stop sign) exemplar white polymer vs. Item 3 (sweatshirt-hood area) unknown white transfer

A limited comparison was conducted between the unknown white transfer noted on Item 3 (sweatshirt-hood area) and to the exemplar white polymer on Item 1 (stop sign). The comparison was limited due to the low quantity and quality of the unknown white transfer noted on Item 3 (sweatshirt-hood area).

The limited comparison between the unknown white transfer on Item 3 (sweatshirt-hood area) and the exemplar white polymer on Item 1 (stop sign) revealed dissimilar class characteristics, including chemical properties.

Item 1 (stop sign) unknown white material from graffiti type lettering vs. Item 3 (sweatshirt-hood area) unknown white transfer

A limited comparison was conducted between the unknown white transfer noted on Item 3 (sweatshirt-hood area) and to the unknown white material from the graffiti type lettering on the bottom of Item 1 (stop sign). The comparison was limited due to the low quantity and quality of the unknown white transfer noted on Item 3 (sweatshirt-hood area).

The limited comparison between the unknown white transfer on Item 3 (sweatshirt-hood area) and the unknown white material from the graffiti type lettering on the bottom of Item 1 (stop sign) revealed both similar and dissimilar class characteristics, including some physical and chemical properties.

Item 1 (stop sign) exemplar white polymer layer vs. Item 3 (back of sweatshirt) unknown white transfer

A limited comparison was conducted between the unknown white transfer noted on Item 3 (back of sweatshirt) and to the exemplar white polymer layer on Item 1 (stop sign). The comparison was limited due to the low quantity and quality of the unknown white transfer noted on Item 3 (back of sweatshirt).

The limited comparison between the unknown white transfer on Item 3 (back of sweatshirt) and the exemplar white polymer on Item 1 (stop sign) revealed similar class characteristics, including physical and chemical properties.

Item 1 (stop sign) unknown white material from graffiti type lettering vs. Item 3 (back of sweatshirt) unknown white transfer

A limited comparison was conducted between the unknown white transfer noted on Item 3 (back of sweatshirt) and to the unknown white material from the graffiti type lettering on the bottom of Item 1 (stop sign). The comparison was limited due to the low quantity and quality of the unknown white transfer noted on Item 3 (back of sweatshirt).

The limited comparison between the unknown white transfer on Item 3 (back of sweatshirt) and the unknown white material from the graffiti type lettering on the bottom of Item 1 (stop sign) revealed dissimilar class characteristics, including chemical properties.

Item 1 (stop sign) exemplar cloudy polymer vs. Item 3 (back of sweatshirt) unknown clear transfer

The unknown clear transfer noted on Item 3 (back of sweatshirt) was compared to the exemplar cloudy polymer on Item 1 (stop sign).

The comparison between the unknown clear transfer on Item 3 (back of sweatshirt) and the exemplar cloudy polymer on Item 1 (stop sign) revealed both similar and dissimilar class characteristics, including some physical and chemical properties.

Item 1 (stop sign) exemplar clear polymer in a pyramid shaped design vs. Item 3 (back of sweatshirt) unknown clear transfer

The unknown clear transfer noted on Item 3 (back of sweatshirt) was compared to the exemplar clear polymer in a pyramid shaped design on Item 1 (stop sign).

The comparison between the unknown clear transfer on Item 3 (back of sweatshirt) and the exemplar clear polymer in a pyramid shaped design on Item 1 (stop sign) revealed dissimilar class characteristics, including physical and chemical properties.

Item 1 (stop sign) exemplar clear polymer vs. Item 3 (back of sweatshirt) unknown clear transfer

The unknown clear transfer noted on Item 3 (back of sweatshirt) was compared to the exemplar clear polymer on Item 1 (stop sign).

The comparison between the unknown clear transfer on Item 3 (back of sweatshirt) and the exemplar clear polymer on Item 1 (stop sign) revealed dissimilar class characteristics, including physical and chemical properties.

Item 1 (stop sign) exemplar clear polymer + white polymer layer vs. Item 3.1 (trace recovered from sweatshirt) unknown clear and white polymer fragment

The unknown clear and white fragment from Item 3.1 (trace recovered from sweatshirt) was compared to the exemplar clear and white polymer layer on Item 1 (stop sign).

The comparison between the unknown clear and white fragment from Item 3.1 (trace recovered from sweatshirt) and the exemplar clear and white polymer layer on Item 1 (stop sign) revealed dissimilar class characteristics, including chemical properties.

Fiber Examination

The exemplar fibers from Item 3 (sweatshirt) were examined and found to be comprised of various shades of gray and black polyester and cotton fibers.

Twelve (A-L) unknown fiber-like artifacts from Item 1 (stop sign) were selected for further comparison to the exemplar fibers from Item 3 (sweatshirt).

The comparison between two of the unknown fibers from Item 1 (stop sign) and the exemplar fibers from Item 3 (sweatshirt) revealed similar class characteristics including fiber type (chemical analysis) and manufacturing characteristics.

A limited comparison was conducted between nine of the unknown fibers from Item 1 (stop sign) and the exemplar fibers from Item 3 (sweatshirt) due to the quality and quantity of the unknown fibers. The comparison revealed similarities of some class characteristics, including fiber type (microscopic exam only).

The comparison between one of the unknown fibers from Item 1 (stop sign) and the exemplar fibers from Item 3 (sweatshirt) revealed dissimilar class characteristics, including manufacturing properties. No further analysis was conducted on this unknown fiber from Item 1 (stop sign).

Only those items discussed in the results above were analyzed for this report. Unless otherwise noted, the results apply to the item(s) as received.

CONCLUSIONS:

Polymer Examination

Item 1 (stop sign) exemplar red polymer coating vs. Item 2 (helmet) unknown red transfer

The source of the exemplar red polymer coating from Item 1 (stop sign) is included as a possible source of the unknown red transfer from Item 2 (helmet).

Item 1 (stop sign) exemplar red polymer coating vs. Item 3 (sweatshirt) unknown red transfer

The source of the exemplar red polymer coating from Item 1 (stop sign) is included as a possible source of the unknown red transfer from Item 3 (sweatshirt).

Item 1 (stop sign) unknown red/white damage from graffiti type lettering vs. Item 3 (sweatshirt) unknown red/white transfer

The source of the unknown red/ white damage noted on the graffiti type lettering on the bottom of Item 1 (stop sign) is included as a possible source of the unknown red /white transfer on Item 3 (sweatshirt).

Item 1 (stop sign) exemplar white polymer vs. Item 3 (sweatshirt-hood area) unknown white transfer
The source of the exemplar white polymer from Item 1 (stop sign) is excluded as a possible source of the unknown white transfer on Item 3 (sweatshirt-hood area) based on a limited comparison.

Item 1 (stop sign) unknown white material from graffiti type lettering vs. Item 3 (sweatshirt-hood area) unknown white transfer
The source of the unknown white material from the graffiti type lettering on the bottom of Item 1 (stop sign) shares both similarities and dissimilarities to the unknown white transfer on Item 3 (sweatshirt-hood area), therefore the results are inconclusive, based on a limited comparison.

Item 1 (stop sign) exemplar white polymer layer vs. Item 3 (back of sweatshirt) unknown white transfer
The source of the exemplar white polymer from Item 1 (stop sign) is included as a possible source of the unknown white transfer on Item 3 (back of sweatshirt) based on a limited comparison.

Item 1 (stop sign) unknown white material from graffiti type lettering vs. Item 3 (back of sweatshirt) unknown white transfer
The source of the unknown white material from the graffiti type lettering on the bottom of Item 1 (stop sign) is excluded as a possible source of the unknown white transfer on Item 3 (back of sweatshirt) based on a limited comparison.

Item 1 (stop sign) exemplar cloudy polymer vs. Item 3 (back of sweatshirt) unknown clear transfer
The source of the exemplar cloudy polymer on Item 1 (stop sign) shares both similarities and dissimilarities to the unknown clear transfer on Item 3 (back of sweatshirt), therefore the results are inconclusive.

Item 1 (stop sign) exemplar clear polymer in a pyramid shaped design vs. Item 3 (back of sweatshirt) unknown clear transfer
The source of the exemplar clear polymer in a pyramid shaped design on Item 1 (stop sign) is excluded as a possible source of the unknown clear transfer on Item 3 (back of sweatshirt).

Item 1 (stop sign) exemplar clear polymer vs. Item 3 (back of sweatshirt) unknown clear transfer
The source of the exemplar clear polymer on Item 1 (stop sign) is excluded as a possible source of the unknown clear transfer on Item 3 (back of sweatshirt).

Item 1 (stop sign) exemplar clear polymer + white polymer layer vs. Item 3_1 (trace recovered from sweatshirt) unknown clear and white polymer fragment
The source of the exemplar clear and white polymer layer on Item 1 (stop sign) is excluded as a possible source of the unknown clear and white fragment in Item 3.1 (trace recovered from sweatshirt).

Fiber Examination

The source of the exemplar fibers from Item 3 (sweatshirt) is included as a possible source of two of the unknown fibers on Item 1 (stop sign).

The results of the comparison between the nine unknown fibers from Item 1 (stop sign) and the exemplar fibers from Item 3 (sweatshirt) are inconclusive due to the quality and quantity of the unknown fibers.

The source of the exemplar fibers from Item 3 (sweatshirt) is excluded as a possible source of one of the unknown fibers on Item 1 (stop sign).

Note: Fibers are mass produced.

Note: Paints and polymers are mass produced.

COMMENTS:

Testimony concerning the examination of the evidence and the results of that examination will be given when requested. The above represents the interpretations/opinions of the undersigned analyst. Except in full, this report may not be reproduced without the written consent of this laboratory.

The laboratory test methods in this report are accredited by the ANSI National Accreditation Board (ANAB) under the ISO/IEC 17025:2017 standard guidelines. Refer to the Rhode Island State Crime Laboratory certificate and scope of accreditation which is located at the ANAB website: http://search.anab.org/

End of Official Report

Respectfully submitted,

Kim Freeland
Criminalist II

Rhode Island State Police

Collision Reconstruction Unit Report

APPENDIX B

Acceleration Calculations

Rhode Island State Police
Collision Reconstruction Unit
311 Danielson Pike
North Scituate, Rhode Island

ACCEL W/ INIT & END VELOCITY & DIST

Find an Acceleration Rate with an Initial and Final Velocity and Distance.

CASE NUMBER: None 11/5/2020

$$a = \frac{Ve^2 - Vi^2}{2 \times D} \qquad a = \frac{0.0000^2 - 19.0710^2}{2 \times 6.0000}$$

$$a = \frac{-363.7030}{12.0000} \qquad a = -30.3085$$

a = Acceleration in FPS².
Ve = Ending Velocity in FPS.
Vi = Initial Velocity in FPS.
2 = A Constant.
D = The Distance in Feet.

Formula Inputs:

The Ending Vel in FPS is:	0.0000
The Initial Vel in FPS is:	19.0710
The Distance in Feet is:	6.0000

Formula Results:

The Accel Rate in FPS² is:	-30.3085

Calculation Notes:

Decelerate from 13 mph to 0 mph in 6 feet

Rhode Island State Police
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311 Danielson Pike
North Scituate, Rhode Island

ACCEL W/ INIT & END VELOCITY & DIST

Find an Acceleration Rate with an Initial and Final Velocity and Distance.

CASE NUMBER: None 11/5/2020

$$a = \frac{Ve^2 - Vi^2}{2 \times D} \qquad a = \frac{0.0000^2 - 88.0200^2}{2 \times 123.0000}$$

$$a = \frac{-7747.5204}{246.0000} \qquad a = -31.4939$$

a = Acceleration in FPS².
Ve = Ending Velocity in FPS.
Vi = Initial Velocity in FPS.
2 = A Constant.
D = The Distance in Feet.

Formula Inputs:

The Ending Vel in FPS is:	0.0000
The Initial Vel in FPS is:	88.0200
The Distance in Feet is:	123.0000

Formula Results:

The Accel Rate in FPS² is:	-31.4939

Calculation Notes:

Auto-Stats Data - Decelerate from 60 mph to 0 mph in 123 feet

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North Scituate, Rhode Island

ACCEL/DRAG FACTOR W/ ACCEL RATE

Find an Acceleration Factor with a known or calculated Acceleration Rate.

CASE NUMBER: None 11/5/2020

$f = a \div 32.2$
$f = -30.3085 \div 32.2$
$f = -0.9412$

f = The Acceleration/Drag Factor.
a = The Acceleration Rate (fps^2/mps^2).
32.2 = Gravity, a constant in fps^2.

Formula Inputs:

Acceleration Rate:	-30.3085

Formula Results:

The Acceleration/Drag Factor is:	-0.9412

Calculation Notes:

Converting Acceleration Rate to Acceleration Factor

Rhode Island State Police

Collision Reconstruction Unit Report

APPENDIX C

BOSCH CRASH DATA RETRIEVAL REPORT

IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

CDR File Information

User Entered VIN	1FM5K8AR9HGE13352
User	T. HASTINGS
Case Number	20-86896
EDR Data Imaging Date	10/19/2020
Crash Date	10/18/2020
Filename	1FM5K8AR9HGE13352_ACM.CDRX
Saved on	Monday, October 19 2020 at 12:17:36
Imaged with CDR version	Crash Data Retrieval Tool 19.4.2
Imaged with Software Licensed to (Company Name)	Providence Police Department
Reported with CDR version	Crash Data Retrieval Tool 19.5.2
Reported with Software Licensed to (Company Name)	Rhode Island State Police
EDR Device Type	Airbag Control Module
ACM Adapter Detected During Download	No
Event(s) recovered	Event Record 1

Comments

No comments entered.

The retrieval of this data has been authorized by the vehicle's owner, or other legal authority such as a court order or search warrant, as indicated by the CDR tool user on Monday, October 19 2020 at 12:17:36.

Data Limitations

Data Imaging:

CAUTION: When imaging data directly from the RCM on a bench top, make sure the RCM is placed on a flat surface without any movement (static) while connected to and powered by the CDR interface. Not following the above guideline for bench top imaging could risk inducing new events to be recorded in the RCM and possibly overwriting a Non airbag deployment.

Note that the RCM Adapter Detected during Download parameter equal to " Yes" indicates that the EDR data was collected directly from the RCM. When equal to "No", it indicates that the EDR data was collected through the OBD II from the vehicle.

Restraints Control Module (RCM) Recorded Crash Event(s):

The RCM can store up to two crash events. Event types are categorized as follow:

1. Non deployment trigger event is an event in which EDR recording trigger threshold is met or exceeded (minimum of 5 mph (8kph) Accumulated Delta Velocity within 150ms interval), but no device(s) have deployed. The data from such event can be overwritten by subsequent events.

2. Airbag deployment event is an event in which frontal, side or curtain airbags have deployed. Note that such event cannot be overwritten or cleared from the Restraints Control Module (RCM). Once the RCM has deployed any airbag device(s), the RCM must be replaced.

3. Some RCM may also categorize Non airbag deployment event. This type is an event in which non airbag devices such as pretentioners, knee bolster etc... have deployed. Note that such event can be overwritten given a subsequent "deployment" event.

"Time zero" or Event Beginning of any event (First Record or Second Record) is defined as the first Algorithm wake up during that event. So all the Pre-Crash, At Event, Delta V Data, deployment times etc... are relative to "Time zero".

It is possible that conditions in a crash may result in an incomplete event data record.

EDR Data Elements Overview/Interpretation in CDR Report:

Under CDR File Information Section

- Event(s) recovered indicates if an event was detected and recorded by RCM. If no event is detected, it will indicate "none". If a trigger or non airbag deployment event is detected, it will indicate "unlocked event". If an airbag deployment is detected, it will indicate "locked frontal event", or "locked side event", or "locked rollover event".

Under System Status at Event Section

- Complete file recorded indicates if data from the recorded event has been fully written to the RCM memory.
- If the RCM detected a peripheral crash sensor was lost during an event, the crash sensor would be identified as well as the time it was lost during that event relative to Time zero. If no loss of a peripheral crash sensor, nothing would be displayed. Note in some vehicles, loss of a peripheral crash sensor may lead to the loss of another peripheral crash sensor due to shared communication.

Under Deployment Data Section

- If the RCM commanded a deployment during an event, the deployment device(s) would be identified as well as the time the RCM commanded its deployment relative to Time zero. If no device was commanded to deploy by the RCM, nothing (no deployment device(s)) would be displayed.

Under Pre-Crash Data -5 to 0 sec

- Steering Wheel Angle if Applicable: positive value indicates left turn, and negative value would indicate right turn.
- Stability Control Lateral Acceleration if Applicable: Lateral Acceleration (Y-direction) is the acceleration along the lateral axis of the vehicle, reported as positive when accelerating to the left.
- Stability Control Longitudinal Acceleration if Applicable: Longitudinal Acceleration (X-direction) is the acceleration along the longitudinal axis of the vehicle, reported as positive when accelerating in a forward direction.
- Stability Control Yaw Rate if Applicable: The Yaw Axis is the vertical axis of the vehicle, generally perpendicular to the plane of the road. A positive Yaw Rate is counter-clockwise when observing the vehicle from above.
- Stability Control Roll Rate if Applicable: The Roll Axis is the longitudinal axis of the vehicle, generally aligned with the primary axis of motion of the vehicle. A positive Roll Rate is counter-clockwise when observing the vehicle from the front.

Under Longitudinal Crash Pulse

- Delta-V, longitudinal: SAE J211 sign convention, negative value generally indicates a front crash and positive value generally indicates a rear crash. Longitudinal delta-V reflects the change in forward velocity that the sensing system experienced from Time zero. It is not the speed the vehicle was traveling before the event. Note that the vehicle speed is recorded separately. This data should be examined in conjunction with other available physical evidence from the vehicle and scene when assessing occupant or vehicle longitudinal delta-V.

Under Lateral Crash Pulse

- Delta-V, lateral: SAE J211 sign convention, Positive value generally indicates a driver side crash and negative value generally indicates a passenger side crash.

Under Rollover Sensor Data (if Applicable)

- Vehicle roll angle if applicable: The Roll Axis is the longitudinal axis of the vehicle, generally aligned with the primary axis of motion of the vehicle. A positive Roll Angle is counter-clockwise when observing the vehicle from the front.

Data Sources:

The Restraints Control Module (RCM) contains all recorded data on any event. Data collected from the RCM comes from multiple sources:

1. Internal to the RCM such as internal sensors for delta Velocity data, rollover angle data if applicable, etc... which are measured, calculated and stored internally.

2. External to the RCM but with a direct connection such as buckle switches, peripheral crash sensors, seat track switch(s) etc... which are measured, calculated and stored internally.

3. External Modules to the RCM such as Powertrain Control Module, Brake Control Module, etc... Theses modules communicate to the RCM via Vehicle Communication Network. The RCM stores the received data internally.

02013_RCM-RC7P_r001

System Status at Time of Retrieval

VIN As Programmed into RCM at Factory	1FM5K8AR9HGE13352
Current VIN (From PCM)	1FM5K8AR9HGE13352
Ignition Cycle, Download (First Record)	4,852
Ignition Cycle, Download (Second Record)	N/A
Restraints Control Module Part Number	HB5T-14B321-AA
Restraints Control Module Serial Number	7063269437220000
Restraints Control Module Software Part Number (Version)	GR3T-14C028-AA
Driver Side/Center Frontal Restraints Sensor Serial Number	00282A72
Driver, Row 1, Side Restraint Sensor 1 Serial Number	000000FE
Driver, Row 2, Side Restraint Sensor 2 Serial Number	002A2A6C
Passenger Frontal Restraints Sensor Serial Number	00282A72
Passenger, Row 1, Side Restraint Sensor 1 Serial Number	0000006C
Passenger, Row 2, Side Restraint Sensor 2 Serial Number	001A2ADD
Steering Wheel Location	Left Hand Drive

System Status at Event (First Record)

Complete File Recorded (Yes,No)	Yes
Multi-Event, Number of Events	1
Time From Event 1 to 2 (msec)	0
Lifetime Operating Timer at Event Time Zero (sec)	36,825,505
Key-On Timer at Event Time Zero (sec)	10,665
Vehicle Voltage at Time Zero (V)	13.9
Energy Reserve Mode Entered During Event (Yes, No)	No

Faults Present at Start of Event (First Record)

No Faults Recorded

Deployment Data (First Record)

Maximum Delta-V, Longitudinal (MPH [km/h])	-7.16 [-11.52]
Time, Maximum Delta-V Longitudinal (msec)	300.0

Pre-Crash Data -1 sec (First Record)

Ignition cycle, Crash	4,846
Frontal Air Bag Warning Lamp, On/Off	Off
Safety Belt Status, Driver	Unbuckled
Seat Track Position Switch, Foremost, Status, Driver	Not Forward
Seat Track Position Switch, Foremost, Status, Front Passenger	Not Forward
Safety Belt Status, Front Passenger	Buckled
Brake Telltale	Off
ABS Telltale	Off
ESC/TC Telltale	Off
ESC/TC Off Telltale	Default Mode
Powertrain Wrench Telltale	Off
Powertrain Malfunction Indicator Lamp (MIL) Telltale	Off

Pre-Crash Data -5 to 0 sec [2 samples/sec] (First Record) - Table 1 of 2

Time (sec)	Speed, Vehicle Indicated (MPH [km/h])	Speed, Vehicle Indicated, Quality Factor	Accelerator Pedal, % Full	Accelerator Pedal, % Full, Quality Factor	Service Brake, On/Off	Service brake, Quality Factor	Engine RPM	ABS Activity (Engaged, Non-Engaged)
- 5.0	35.0 [56]	OK	23.4	OK	Off	OK	5,254	Non-engaged
- 4.5	35.8 [58]	OK	0.0	OK	Off	OK	4,556	Non-engaged
- 4.0	34.9 [56]	OK	0.0	OK	On	OK	3,414	Non-engaged
- 3.5	32.6 [52]	OK	0.0	OK	On	OK	1,998	Non-engaged
- 3.0	29.7 [48]	OK	0.0	OK	Off	OK	1,714	Non-engaged
- 2.5	28.3 [45]	OK	0.0	OK	On	OK	1,178	Non-engaged
- 2.0	27.7 [45]	OK	0.0	OK	Off	OK	1,062	Non-engaged
- 1.5	27.4 [44]	OK	100.0	OK	Off	OK	1,310	Non-engaged
- 1.0	26.5 [43]	OK	84.8	OK	On	OK	2,004	Non-engaged
- 0.5	22.9 [37]	OK	0.0	OK	On	OK	1,512	Engaged
0.0	18.5 [30]	OK	0.0	OK	On	OK	1,018	Engaged

Pre-Crash Data -5 to 0 sec [2 samples/sec] (First Record) - Table 2 of 2

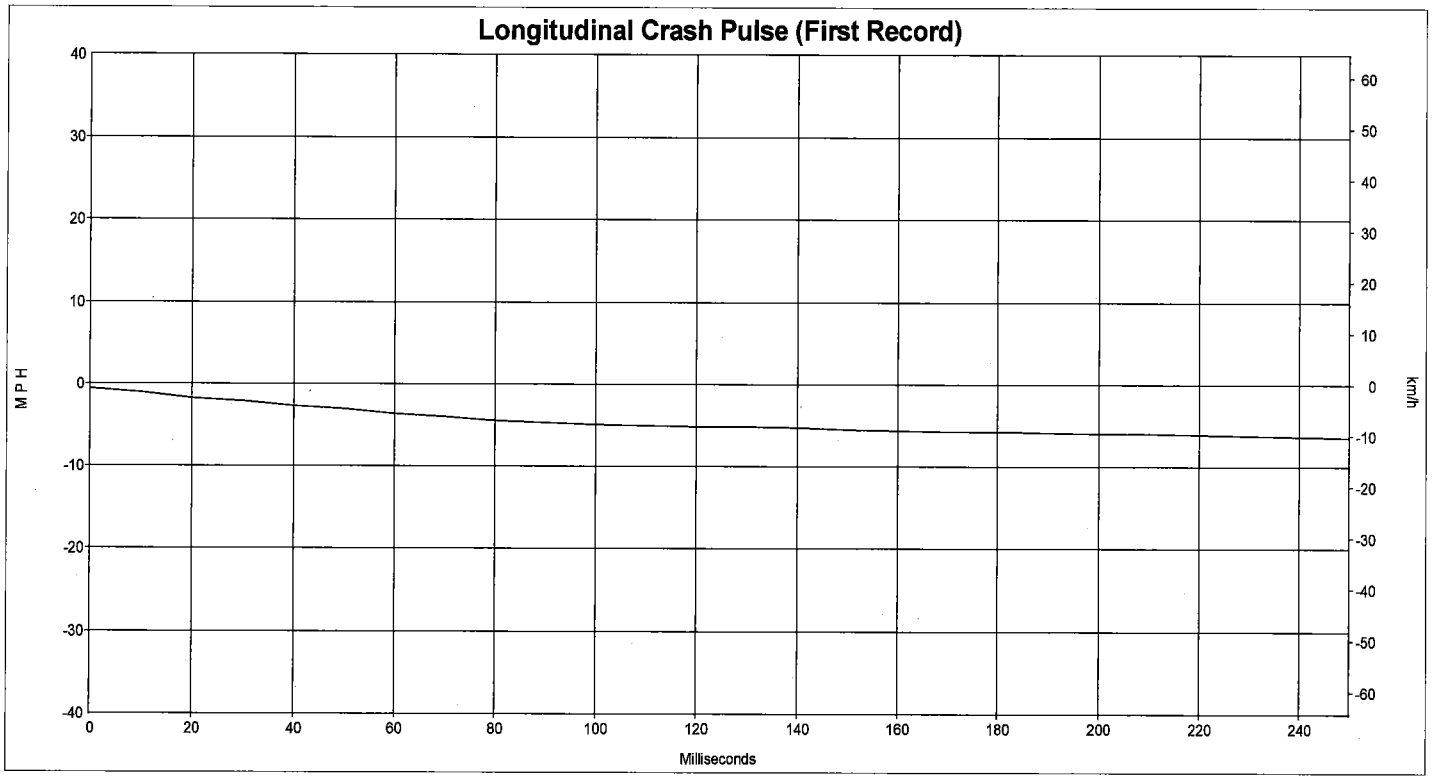
Time (sec)	Brake Powertrain Torque Request 1	Brake Powertrain Torque Request 2	Traction Control via Brakes	Wheel Torque (N-m)	Speed Control Status	Driver Gear Selection (Auto Trans)	Occupant Size Classification, Front Passenger (Child size Yes/No [Hex value])
- 5.0	No	No	No	1,408	Off	Drive	Yes [$02]
- 4.5	No	No	No	-84	Off	Drive	Yes [$02]
- 4.0	No	No	No	-100	Off	Drive	Yes [$02]
- 3.5	No	No	No	-148	Off	Drive	Yes [$02]
- 3.0	No	No	No	-132	Off	Drive	Yes [$02]
- 2.5	No	No	No	-100	Off	Drive	Yes [$02]
- 2.0	No	No	No	64	Off	Drive	Yes [$02]
- 1.5	No	No	No	164	Off	Drive	Yes [$02]
- 1.0	No	No	No	1,172	Off	Drive	Yes [$02]
- 0.5	Yes	No	No	180	Off	Drive	Yes [$02]
0.0	No	No	No	-148	Off	Drive	Yes [$02]

Pre-Crash Data -5 to 0 sec [10 samples/sec] (First Record)

Time (sec)	Stability Control Lateral Acceleration (g)	Stability Control Longitudinal Acceleration (g)	Stability Control Yaw Rate (deg/sec)	Stability Control Roll Rate (deg/sec)	Steering Wheel Angle (deg)
- 5.0	0.16	-0.11	4.58	-0.63	18.8
- 4.9	0.12	-0.16	4.42	0.87	16.4
- 4.8	0.11	-0.07	3.72	-0.07	14.0
- 4.7	0.09	-0.03	2.66	-0.19	10.8
- 4.6	0.11	-0.05	1.95	1.11	10.6
- 4.5	0.09	-0.10	2.29	-0.19	10.9
- 4.4	0.06	-0.16	2.18	0.44	10.2
- 4.3	0.10	-0.13	1.95	0.23	10.1
- 4.2	0.08	-0.13	2.09	0.71	10.1
- 4.1	0.07	-0.17	2.11	-0.71	11.1
- 4.0	0.06	-0.16	2.29	0.39	11.3
- 3.9	0.05	-0.21	2.18	-0.19	10.9
- 3.8	0.06	-0.34	2.15	-0.95	10.1
- 3.7	0.04	-0.53	2.04	-0.52	7.0
- 3.6	0.00	-0.57	0.77	-1.40	0.8
- 3.5	-0.06	-0.38	-1.40	-1.64	-8.9
- 3.4	-0.16	-0.11	-4.70	-2.96	-22.6
- 3.3	-0.13	-0.05	-7.33	-1.51	-26.6
- 3.2	-0.28	-0.05	-7.98	-0.71	-33.3
- 3.1	-0.20	-0.05	-8.79	-1.91	-36.0
- 3.0	-0.20	-0.10	-8.81	1.32	-31.5
- 2.9	-0.14	-0.29	-6.45	3.60	-21.6
- 2.8	-0.06	-0.25	-3.95	2.72	-13.7
- 2.7	-0.06	-0.12	-2.88	2.12	-10.8
- 2.6	-0.11	-0.05	-3.84	-1.16	-19.8
- 2.5	-0.17	-0.05	-6.63	-1.19	-30.8
- 2.4	-0.26	-0.05	-9.38	-1.67	-43.6
- 2.3	-0.19	-0.04	-10.40	1.59	-38.5
- 2.2	-0.17	-0.03	-7.65	3.95	-26.6
- 2.1	-0.08	-0.03	-5.04	3.28	-17.9
- 2.0	0.00	-0.06	-2.76	2.99	-5.1
- 1.9	0.15	-0.06	1.38	4.19	17.5
- 1.8	0.30	-0.06	8.23	5.72	49.7
- 1.7	0.27	0.00	13.22	1.43	53.2
- 1.6	0.21	0.01	9.72	-4.79	29.9
- 1.5	-0.03	0.01	2.22	-7.87	1.9
- 1.4	-0.42	-0.05	-8.54	-12.59	-64.0
- 1.3	-0.61	-0.11	-21.57	-9.72	-137.5
- 1.2	-0.73	-0.31	-29.61	-0.31	-179.3
- 1.1	-0.92	-0.10	-35.43	-0.36	-219.6
- 1.0	-0.91	-0.12	-41.41	-3.95	-266.1
- 0.9	-0.83	-0.10	-45.39	0.76	-282.4
- 0.8	-0.90	-0.27	-42.68	-0.52	-274.9
- 0.7	-0.77	-0.58	-31.89	3.47	-244.3
- 0.6	-0.74	-0.53	-28.29	9.40	-200.5
- 0.5	-0.58	-0.48	-27.57	4.84	-172.2
- 0.4	-0.33	-0.60	-22.88	3.60	-138.1
- 0.3	-0.32	-0.74	-17.50	0.28	-113.6
- 0.2	-0.21	-0.85	-14.91	-1.51	-111.6
- 0.1	-0.35	-0.75	-16.59	2.99	-166.8
0.0	-0.38	-0.80	-21.61	-0.23	-269.8

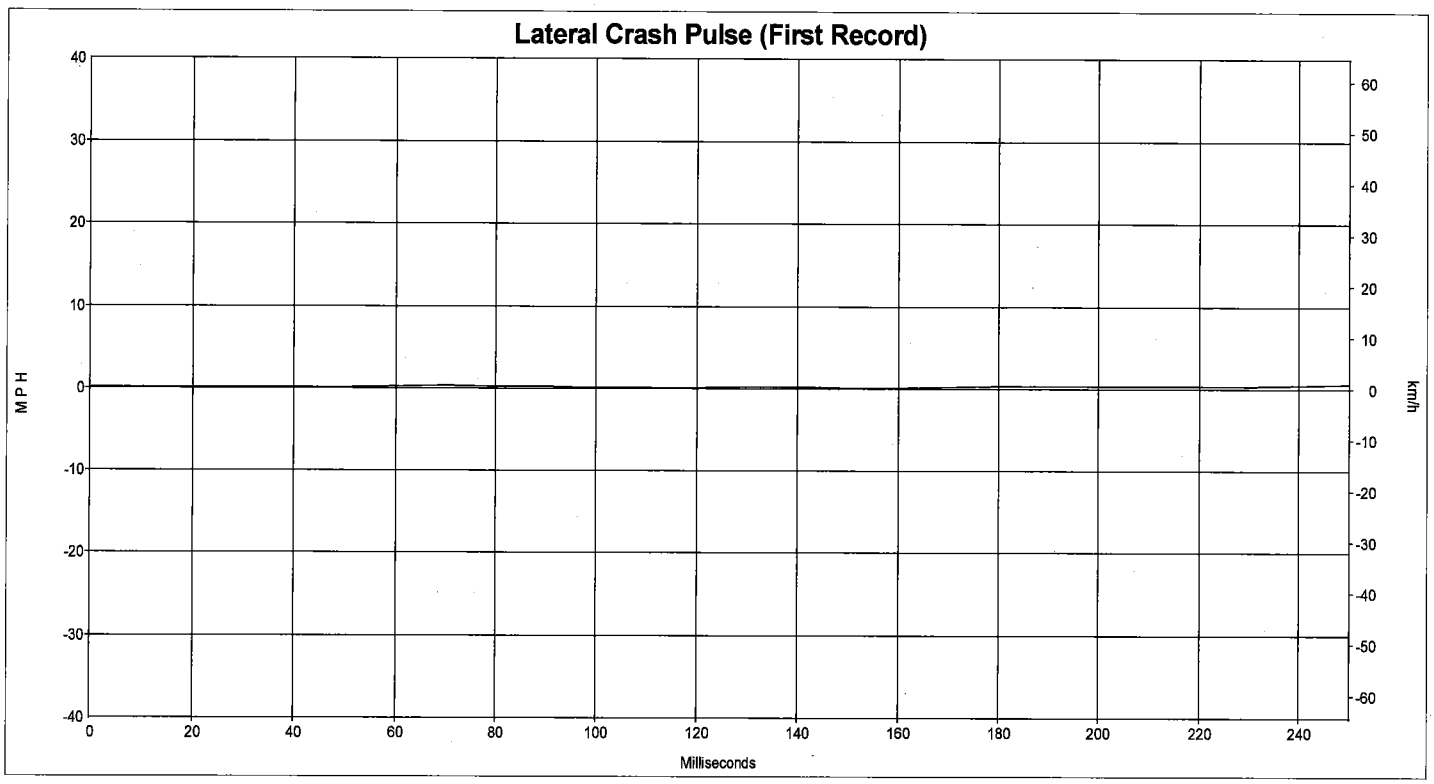
Post-Crash Data 0 to 5 sec [4 samples/sec] (First Record)

Time (sec)	Impact Event Feedback Status
0.00	Normal
0.25	Normal
0.50	Normal
0.75	Normal
1.00	Normal
1.25	Normal
1.50	Normal
1.75	Normal
2.00	Normal
2.25	Normal
2.50	Normal
2.75	Normal
3.00	Normal
3.25	Normal
3.50	Normal
3.75	Normal
4.00	Normal
4.25	Normal
4.50	Normal
4.75	Normal
5.00	Normal



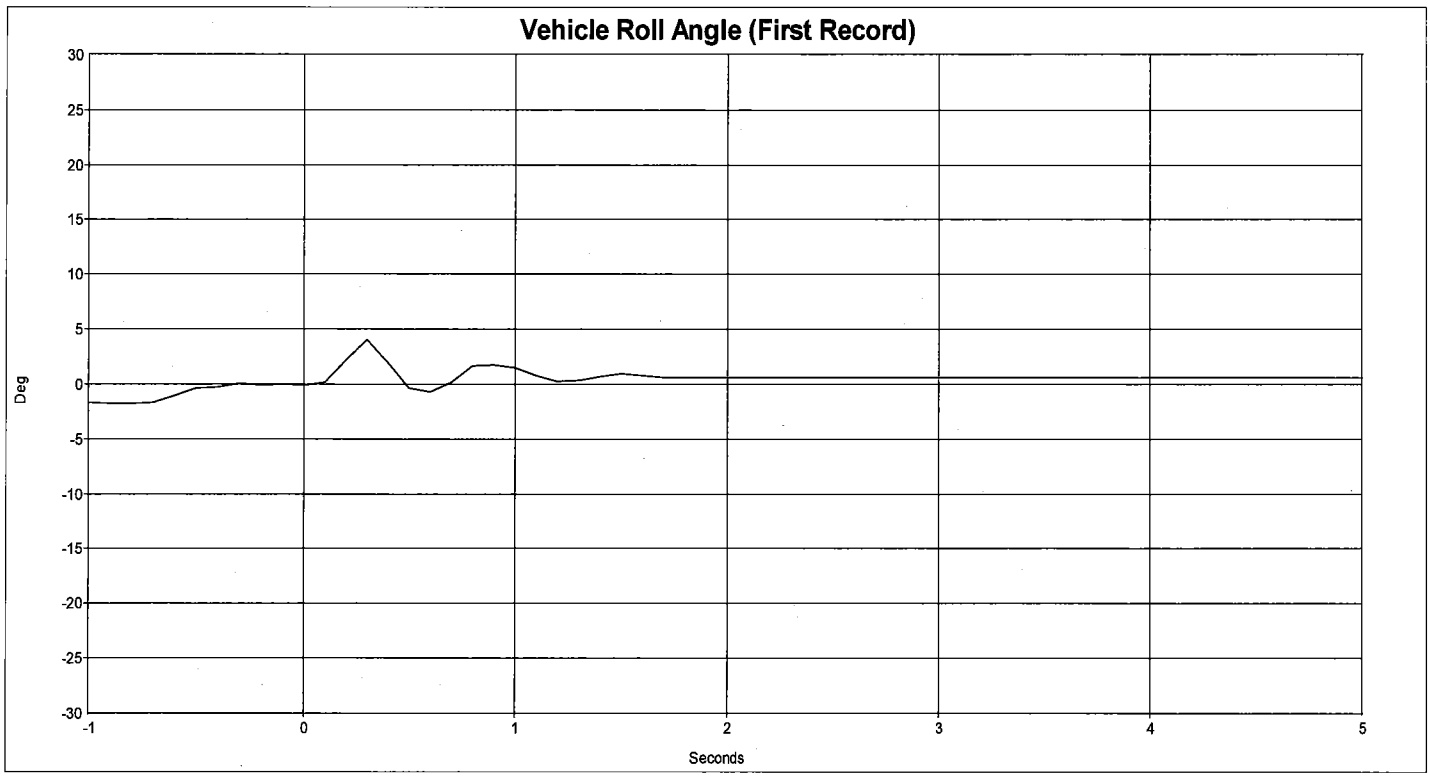
Longitudinal Crash Pulse (First Record)

Time (msec)	Delta-V, longitudinal (MPH)	Delta-V, longitudinal (km/h)
0	-0.59	-0.95
10	-1.01	-1.62
20	-1.70	-2.74
30	-2.14	-3.45
40	-2.70	-4.34
50	-3.05	-4.91
60	-3.62	-5.83
70	-4.03	-6.49
80	-4.42	-7.11
90	-4.70	-7.57
100	-4.92	-7.92
110	-5.08	-8.18
120	-5.13	-8.26
130	-5.19	-8.35
140	-5.30	-8.53
150	-5.51	-8.87
160	-5.62	-9.05
170	-5.74	-9.23
180	-5.78	-9.31
190	-5.87	-9.44
200	-5.95	-9.57
210	-5.99	-9.64
220	-6.08	-9.78
230	-6.20	-9.97
240	-6.34	-10.20
250	-6.50	-10.46



Lateral Crash Pulse (First Record)

Time (msec)	Delta-V, Lateral (MPH)	Delta-V, Lateral (km/h)
0	0.09	0.14
10	0.09	0.14
20	0.06	0.10
30	0.10	0.16
40	0.15	0.24
50	0.17	0.27
60	0.28	0.45
70	0.32	0.51
80	0.29	0.46
90	0.20	0.32
100	0.15	0.24
110	0.12	0.19
120	0.15	0.24
130	0.19	0.30
140	0.19	0.30
150	0.07	0.12
160	0.14	0.23
170	0.26	0.42
180	0.33	0.53
190	0.31	0.50
200	0.34	0.55
210	0.34	0.55
220	0.32	0.52
230	0.39	0.62
240	0.48	0.77
250	0.59	0.95



Vehicle Roll Angle (First Record)

Time (sec)	Vehicle Roll Angle (deg)
-1.0	-1.63
-0.9	-1.78
-0.8	-1.75
-0.7	-1.68
-0.6	-1.08
-0.5	-0.39
-0.4	-0.22
-0.3	0.09
-0.2	-0.08
-0.1	-0.03
0.0	-0.06
0.1	0.20
0.2	2.23
0.3	4.02
0.4	1.93
0.5	-0.34
0.6	-0.72
0.7	0.20
0.8	1.69
0.9	1.78
1.0	1.49
1.1	0.81
1.2	0.23
1.3	0.32
1.4	0.73
1.5	0.95
1.6	0.81
1.7	0.65
1.8	0.60
1.9	0.60
2.0	0.65
2.1	0.65
2.2	0.65
2.3	0.63
2.4	0.63
2.5	0.63
2.6	0.62
2.7	0.62
2.8	0.62
2.9	0.63
3.0	0.63
3.1	0.63
3.2	0.63
3.3	0.63
3.4	0.63
3.5	0.63
3.6	0.63
3.7	0.63
3.8	0.63
3.9	0.63
4.0	0.63
4.1	0.63
4.2	0.63
4.3	0.64
4.4	0.64
4.5	0.64
4.6	0.64
4.7	0.64
4.8	0.64
4.9	0.64
5.0	0.64

Hexadecimal Data

Data that the vehicle manufacturer has specified for data retrieval is shown in the hexadecimal data section of the CDR report. The hexadecimal data section of the CDR report may contain data that is not translated by the CDR program. The control module contains additional data that is not retrievable by the CDR system.

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$5B17 - Event Type
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$F113 - RCM Part Number
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$F18C - RCM Serial Number
37 30 36 33 32 36 39 34 33 37 32 32 30 30 30 30

$F188 - RCM Software Part Number
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$5800 - Left/Center Frontal Restraints Sensor Serial Number
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$5801 - Left Side Restraints Sensor One Serial Number
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$5802 - Left Side Restraints Sensor Two Serial Number
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$5804 - Right Frontal Restraints Sensor Serial Number
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$5805 - Right Side Restraints Sensor One Serial Number
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$5806 - Right Side Restraints Sensor Two Serial Number
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$DE00 - Original VIN
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$F190 - Current VIN
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$DE01 - RCM Option Content
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$5817 - Event Record 1

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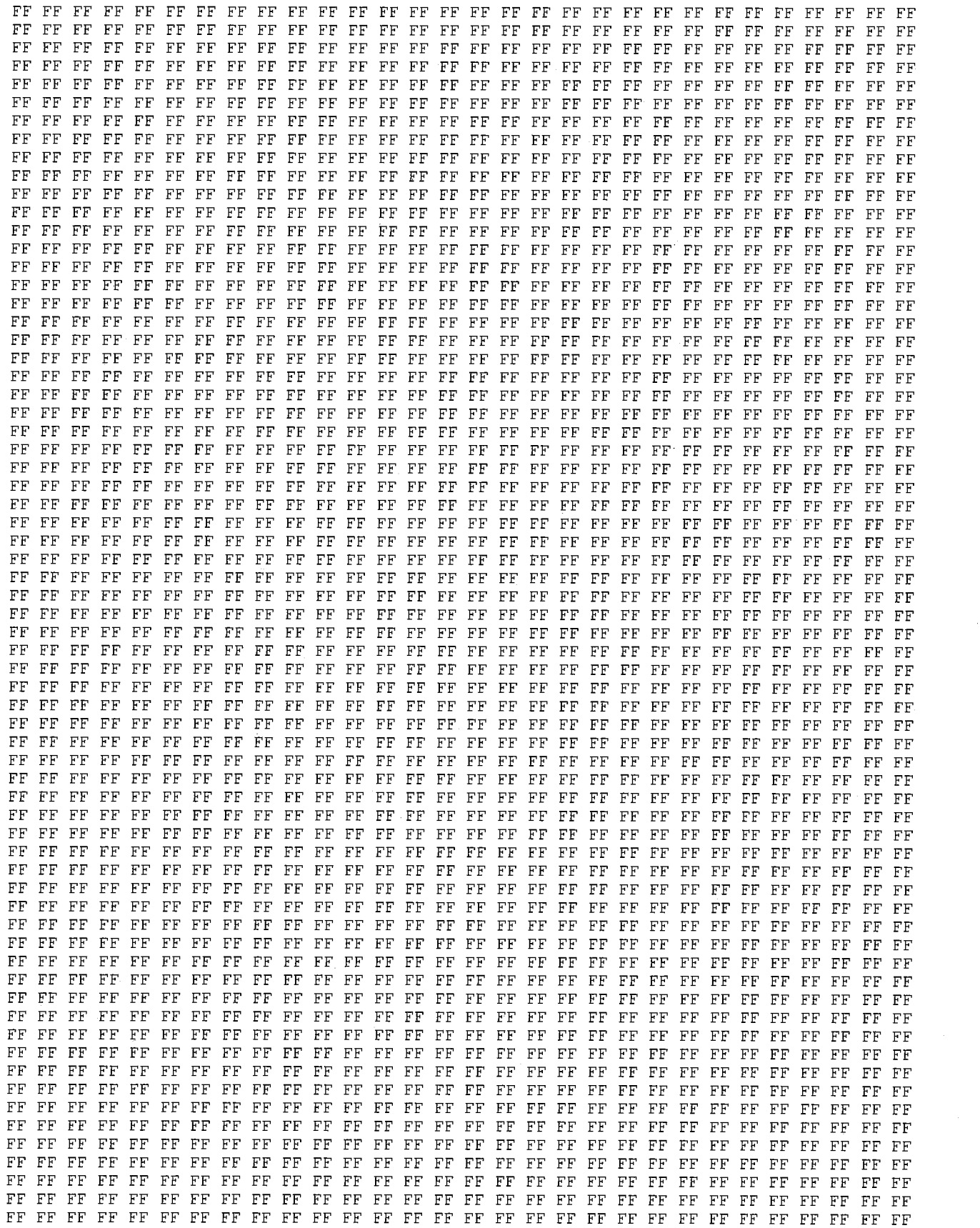

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$5818 - Event Record 2


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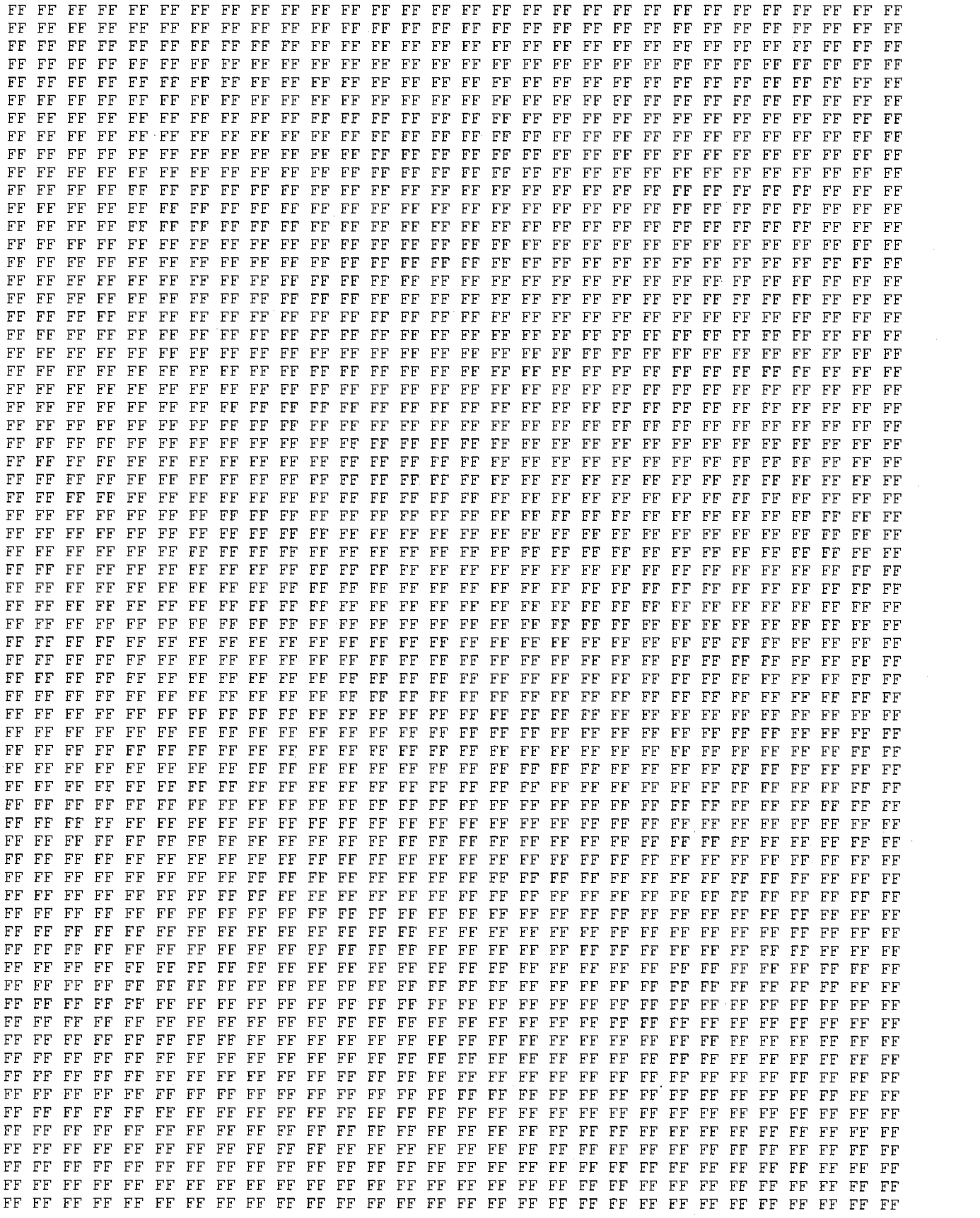

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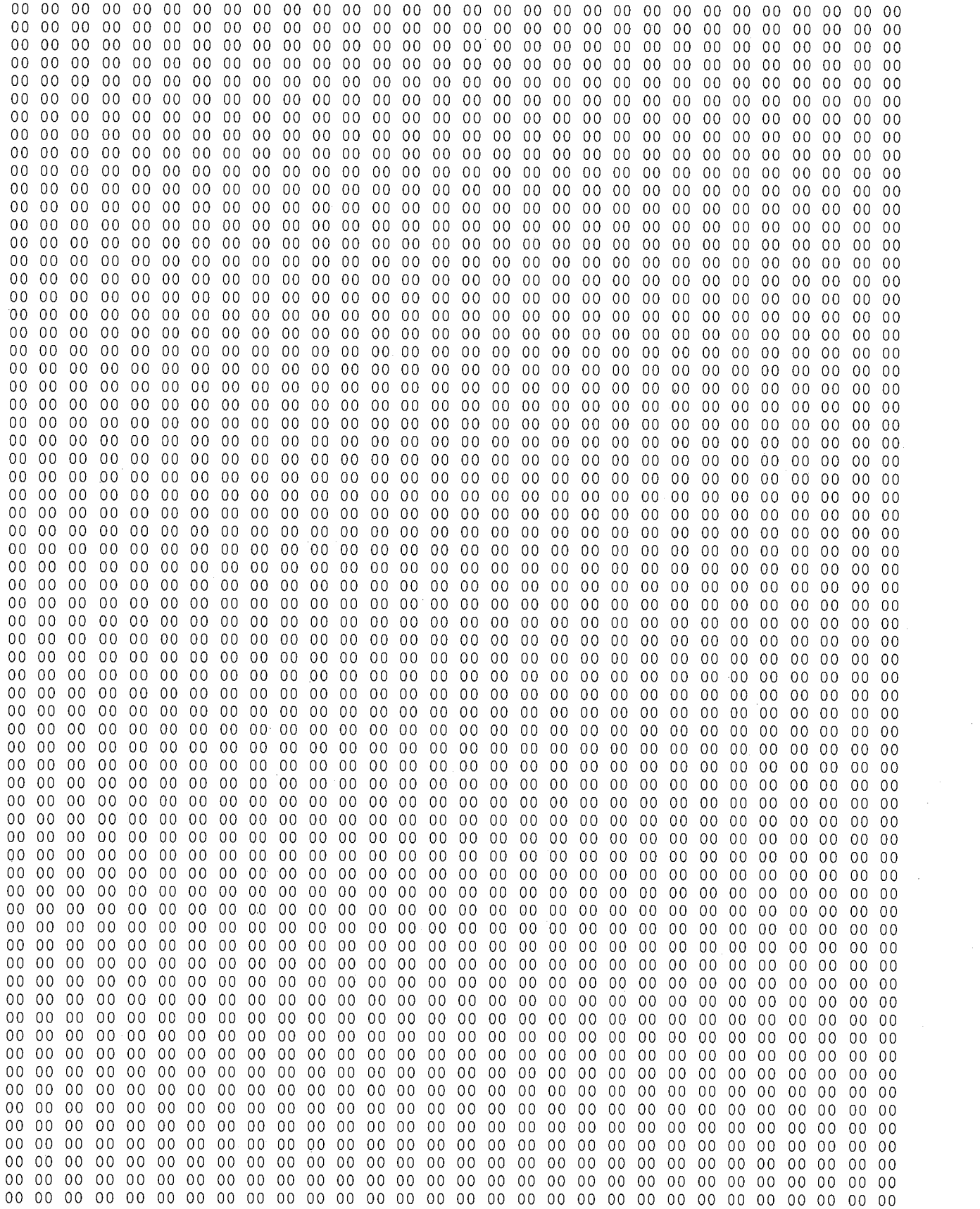

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