I. Policy
Arizona allows the testing or operation of autonomous vehicles equipped with automated driving systems on public roads with or without a person present in the vehicle. All autonomous vehicles are required to comply with federal law, Arizona law, and all Arizona Department of Transportation regulations and policies. These vehicles may be involved in situations that require law enforcement intervention or contact, such as collisions, violations of Arizona traffic laws, and criminal conduct involving the vehicle or occurring inside the vehicle. This directive is intended to provide procedural guidance and information as officers have increasingly more contact with autonomous vehicles. Officers shall follow the procedures outlined in this policy when investigating a collision, traffic or criminal violation, or incident involving a fully autonomous vehicle with no operator present. In all situations officers shall also be guided by existing policies, procedures, statutes and rules.

II. Definitions
For the purposes of this policy the following definitions apply:
A. “Automated Driving System” means the hardware and software that are collectively capable of performing the entire dynamic driving task on a sustained basis, regardless of whether it is limited to a specific operational design domain.
B. “Drive” means to operate or be in actual physical control of a vehicle.
C. “Dynamic driving task” means all the real time operational and tactical functions required to operate a vehicle in on-road traffic, excluding the strategic functions such as trip scheduling and selection of destinations and waypoints, and including without limitation:
   1. Lateral vehicle motion control via steering;
   2. Longitudinal motion control via acceleration and deceleration;
   3. Monitoring the driving environment via object and event detection, recognition, classification, and response preparation;
   4. Object and event response execution;
   5. Maneuver planning; and
   6. Enhancing conspicuity via lighting, signaling, and gesturing.
D. “Fully autonomous vehicle” means a motor vehicle that is equipped with an automated driving system designed to function as a level four or five system under SAE J3016. Such a vehicle may be designed to function solely by use of the automated driving system, or when the automated driving system is not engaged, to permit operation by a human person.
E. “Minimal risk condition” means a low-risk operating mode in which a fully autonomous vehicle operating without a human person achieves a reasonably safe state, such as bringing the vehicle to a complete stop upon experiencing a failure of the vehicle’s automated driving system that renders the vehicle unable to perform the entire dynamic driving task.
F. “Operational design domain” means a description of the specific operating domain(s) in which an automated driving system is designed to properly operate, including but not limited to geographical area of operation, roadway types, speed range, environmental conditions (weather, daytime/nighttime etc.), and other domain constraints.
G. “Person” includes a corporation, company, partnership, firm, association or society, as well as a natural person. When the word "person" is used to designate the party whose property may be the subject of a criminal or public offense, the term includes the United States, this state, or any territory, state or country, or any political subdivision of this state that may lawfully own any property, or a public or private corporation, or partnership or association. When the word "person" is used to designate the violator or offender of any law, it includes corporation, partnership or any association of persons.

III. Requirements of Fully Autonomous Vehicle Companies
A. The person operating a fully autonomous vehicle shall provide the Arizona Department of Public Safety and the Arizona Department of Transportation a copy of a law enforcement interaction protocol that will instruct first responders in the vicinity of the operational design domain how to interact with the fully autonomous vehicle in emergency and traffic enforcement situations. This interaction policy shall be on file with Operational Communications and available through the Arizona Department of Transportation Motor Vehicle Division (MVD).
B. The law enforcement interaction protocol shall include:
   1. How to communicate with a fleet support specialist who is available during the times the vehicle is in operation;
   2. How to safely remove the vehicle from the roadway;
   3. How to recognize whether the vehicle is in autonomous mode and steps to safely tow the vehicle;
   4. A description of the cities where the vehicle will be in operation;
   5. Any additional information the manufacturer deems necessary regarding hazardous conditions or public safety risks associated with the operation of the autonomous vehicle.

IV. Enforcement
For the purposes of this section, vehicle owner, registration, insurance, and contact information for the fully autonomous vehicle can be accessed through the Arizona Department of Transportation Motor Vehicle Division system. Exchange of information, issuance of citations and/or repair orders with the fully autonomous vehicle owner shall be done through the electronic mail or physical mailing address provided, which can be accessed through the MVD system.
A. Traffic Collisions
Collisions involving fully autonomous vehicles shall be investigated in accordance with Arizona Revised Statutes Title 28, Chapter 3, Article 4.
   1. The fully autonomous vehicle’s owner, contact information, registration, and insurance information shall be noted on the Arizona Crash Report.
   2. If injury to a person, damage to any vehicle, or damage to any other property occurred in the collision, the officer shall provide the fully autonomous vehicle’s owner’s name, address, and insurance information to the drivers of all other vehicles, any injured parties involved in the collision, and owners of damaged property.
3. If the fully autonomous vehicle violates a traffic law resulting in the collision, the officer may issue a citation to the registered owner of the vehicle.

B. Disabled Vehicles
   1. If a fully autonomous vehicle becomes disabled as a result of a collision or malfunction, and the owner is unable to provide for its custody or removal, the officer shall remove the vehicle or cause it to be removed for any of the following:
      b. For seizure pursuant to law.
      c. For obstruction of traffic.
      d. When disabled in a gore point.
      e. When disabled or abandoned in a hazardous location.
   2. Officers shall inventory the fully autonomous vehicle prior to its removal, documenting the contents and condition of the vehicle on the Vehicle Removal Report.

C. Arizona Revised Statute: Title 28 Violations
   1. If a fully autonomous vehicle that is operated on a roadway is not registered or does not display license plates for the current registration year, officers shall issue a citation to the vehicle owner pursuant to A.R.S. § 28-2532.
   2. If a fully autonomous vehicle does not have documents on file with the MVD that show it meets the financial responsibility requirements under A.R.S. § 28-4135, officers shall issue a citation to the registered owner of the vehicle.
   3. Repair orders may be issued to the registered owner of fully autonomous vehicles for equipment violations.
   4. All citations and/or repair orders shall be issued to the electronic mail or physical mailing address to the person listed on file through the Arizona Department of Transportation MVD system.
Nuro Arizona Law Enforcement Protocol for Fully Autonomous Vehicles

October 26, 2018
To prepare local Law Enforcement for the Nuro R1 vehicle traveling on public roadways and in response to the request from the Arizona Department of Public Safety and Arizona Department of Transportation for a Law Enforcement Protocol for Fully Autonomous Vehicles with no operator present, Nuro is providing the following information:

- How to communicate with a fleet support specialist who is available during the times the vehicle is in operation;
- How to safely remove the vehicle from the roadway;
- How to recognize whether the vehicle is in autonomous mode and steps to safely tow the vehicle;
- A description of the cities where the vehicle will be in operation;
- Any additional information the manufacturer deems necessary regarding hazardous conditions or public safety risks associated with the operation of the autonomous vehicle.

This document may be updated, as needed, prior to and during ongoing vehicle testing and operations. If updated, we will promptly provide law enforcement with an updated copy. If you or your organization has questions or would like to provide feedback based on this document, please contact Nuro at azlawenforcement@nuro.ai.
Our mission is to accelerate the benefits of robotics for everyday life. Our vehicle is a fully autonomous, on-road vehicle designed to transport goods — quickly, safely, and affordably. With no driver or passengers to worry about, our vehicle has been engineered from the ground up to keep what’s outside even safer than what’s inside.

As a company, Nuro operates and tests a few different vehicle types/designs in multiple States, and maintains compliance with all local Autonomous Vehicle regulations. Our vehicle, R1, has no space for human occupants and no driver present inside the vehicle. Nuro R1 complies with all applicable Federal Motor Vehicle Safety Standards.

Vehicle ownership information

Owner Name: Nuro, Inc.
Owner Driver License or EIN: 
Business Location: P.O. Box 2575, Scottsdale, AZ 85252
Contact Information: (480) 840-7185 or feedback@nuro.ai
1) How to communicate with a fleet support specialist who is available during the times the vehicle is in operation

Nuro supports our fleet with Nuro Operations Specialists. Because the R1 vehicle is entirely unmanned, there is no human available in the vehicle to directly communicate with police, fire, and other first responders. Nuro Operations Specialists will be available 24/7 through a dedicated law enforcement hotline. This phone number will be provided directly to state and local agencies in the designated vehicle operating areas. Nuro Operations Specialists monitor the location of the vehicle, understand its status, and can, if necessary, obtain remote control of the unmanned vehicle. In addition, emergency personnel can contact any support number listed online to connect to the appropriate operator to provide assistance.

Law Enforcement or customers can also obtain the support phone number by pressing the “Help” button on the vehicle’s side-panel screen.

Typically, a Safety Chase Vehicle will be in convoy, following closely behind the Nuro R1. This Chase Vehicle will function and appear like a normal passenger vehicle, but will be specially equipped to monitor, evaluate, and serve as a backup control platform for R1. Trained operators seated in the Chase Vehicle will be actively monitoring R1’s behaviors, including potential Law Enforcement interactions. In the event that Law Enforcement needs to communicate with a Nuro Operations Specialist while the vehicle is in operation, the operators in the Chase Vehicle will also be available to assist them.

Relevant documentation for all Nuro vehicles can be provided electronically to Law Enforcement upon request to the Nuro Operations Specialist in communication with the requesting individual. In addition, when present, the Nuro Operations Specialist in the Safety Chase Vehicle actively in convoy with the Nuro Unmanned Vehicle on public roads will have the relevant documentation for the vehicle to provide Law Enforcement or other parties upon request.
2) How to safely remove the vehicle from the roadway

If law enforcement wishes to direct the Nuro vehicle to pull to the side of the road while in operation, the most efficient method is to pull over the Safety Chase Vehicle, when present, in the same manner as any other vehicle on the road. The operators in the Safety Chase Vehicle will pull over the Nuro Unmanned Vehicle in convoy.

The Nuro Operations Specialists available on the 24/7 Law Enforcement hotline are also able to remotely disable the Nuro vehicle and safely remove it from the roadway.

3) How to recognize whether the vehicle is in autonomous mode and steps to safely tow the vehicle

Law enforcement can contact the 24/7 hotline if they need to understand whether any particular vehicle is in autonomous mode. When a Nuro autonomous vehicle is pulled over by the Safety Chase Vehicle operators or a remote operator at law enforcement’s direction, it will always be taken out of autonomous mode. The vehicle will not resume autonomous operations until it is activated by a Nuro Operation Specialist who has gone through a complete checklist that includes verbal confirmation from any Law Enforcement present that it can resume operation.

A stopped Nuro vehicle does not necessarily mean the vehicle is inoperable; it may have detected an obstacle that requires it to stop for safety reasons. If that obstacle resolves itself, the vehicle may resume normal operations and start moving.

If the vehicle is unable to move, a Nuro Operations Specialist is automatically and immediately notified and appropriate action is taken. A Nuro Operation Specialist is available to arrange for vehicle towing when needed. The Chase Vehicle, in convoy, is also equipped with a tow hook that can be attached to assist with towing operations. Towing personnel should be made aware that the vehicle has an electric battery pack housed within the chassis and use appropriate precautions. Please refer to section 5 in this document for battery safety precautions.
4) A description of the cities where the vehicle will be in operation

The primary operational area of the Nuro R1 Unmanned Vehicle is the 85257 zip code in southern Scottsdale, Arizona. The vehicle may occasionally be in the immediately adjacent area, which includes portions of Scottsdale, Tempe, and Phoenix, as well as public roads in the Salt River Pima-Maricopa Indian Community.

The vehicle is designed to travel autonomously within the Nuro Mapped Area and autonomous operation is not enabled outside of that area. The Nuro Mapped Area is a specific geographic area where Nuro vehicles specially equipped with sensors have collected necessary data to ensure safe autonomous vehicle driving. The route an Unmanned R1 vehicle travels has also been successfully driven by a manned autonomous vehicle with a safety driver. Specific information on the most up-to-date operating area can be obtained by contacting Nuro at feedback@nuro.ai.

5) Any additional information the manufacturer deems necessary regarding hazardous conditions or public safety risks associated with the operation of the autonomous vehicle

Traction Battery (Main Battery)

The Nuro R1 has a 14.1kWh 48V lithium-ion battery pack located near the bottom of the vehicle. It consists of eight separate modules. The maximum voltage anywhere in the vehicle is less than 60VDC.

The Nuro R1 vehicle Low Voltage system has considerably less voltage than a standard electric passenger vehicle High Voltage system however precautions should still be taken when handling a damaged vehicle.
It is recommended that the vehicle never be lifted from the battery area as it may puncture the battery and cause injury. If lifting is required, use the designated areas to do so.

If Nuro R1 is submerged in water, the vehicle should be removed using the same precautions, including Personal Protective Equipment. Once the vehicle is removed from the water, contact a Nuro Operations Specialist, who will arrange for Nuro to promptly retrieve the vehicle.

In the event of a fire, please follow the guidelines below:

1. For small fires, use only sand, dry chemical carbon dioxide, nitrogen, halon, or regular foam to extinguish. Continuously apply solution until fire is extinguished.

2. Large fires should only be extinguished by trained firefighters with copious quantities of water spray until the fire is extinguished. The amount of water could be up to 2,000 gallons to put out a fire. If water is not immediately available, fire extinguishing agents such as carbon dioxide or foam, may be used to put out the fire until water is available.

3. Personal Protective Equipment should be used even after fire and smoke have subdued.

4. Do not use small quantities of water. If water spray is used, it must be continually applied until fire is extinguished.

Lithium ion batteries contain a flammable liquid electrolyte that may vent, ignite, and produce sparks when subjected to high temperatures or when damaged or abused.

The interaction of water or water vapor with the battery electrolyte may result in the generation of hydrogen and hydrogen fluoride (HF) gas. Contact with the battery electrolyte may be irritating to the skin, eyes, and mucous membranes.

First responders should use the appropriate Personal Protective Equipment, including a self-contained breathing apparatus (SCBA) and take appropriate measures to protect civilians downwind.

The Safety Chase Vehicle carries a fire extinguisher and other equipment to assist in dealing with fire-related issues.

Nuro’s mission is to accelerate the benefits of robotics for everyday life. We measure our success by how many people’s lives are substantially improved by our products. That’s why we created the first fully self-driving, on-road vehicle designed to transport goods — quickly, safely, and affordably. With the help of robotics, we can significantly improve people’s day-to-day lives, transform local commerce, and make our roads safer.

We seek to work with groups and organizations also driven by this mission. Nuro is open to conducting demonstrations of the R1 vehicle with law enforcement officials and engaging in dialogue about the handling of potential emergency situations.

Additional information on Nuro’s approach to safety can be found within Nuro’s Safety Self-Assessment report (www.nuro.ai/safety), submitted to the National Highway Traffic Safety Administration in September of 2018.

**Backup Batteries**

The Nuro R1 has two 18Ah, 12V sealed lead-acid backup batteries located near the base of the vehicle. The emergency response requirements for these batteries are similar to standard passenger vehicles.

**Doors**

Each of the Nuro R1 cargo doors have a manual opening apparatus on the inside. To manually open from the inside, push the lever located at the bottom center of the door to the right.

**Conclusion**
Introduction

The Waymo Fully Self-Driving Chrysler Pacifica is based on the Chrysler Pacifica Hybrid.

This document includes material from the FCA 2017 Pacifica Hybrid Emergency Response Guide and supplemental information related to the Waymo self-driving system.

This guide is intended to be used by trained first responders and assumes a professional-level background in safely responding to emergencies, including those involving damaged vehicles.
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Waymo has established a toll-free 24-hour telephone hotline dedicated to allowing police, fire departments, and other first responders to communicate directly with Waymo's professionally-trained specialists at any time during our vehicle testing and operation on public roads.

We ask that emergency responders calling this hotline identify the numerical identifier of the vehicle in question, license plate, and any location information available.
The Waymo fully self-driving Chrysler Pacifica Hybrid minivans can be easily identified by the white color with Waymo logos, roof assembly, front fender additions, or rear roof additions below.

During driverless testing and operation, Waymo’s vehicles are fully self-driving at all times, and will not have any person in the driver’s seat either steering or otherwise controlling the vehicle.
Each Waymo vehicle is identified by license plate, in addition to required identifiers in the jurisdiction (e.g., vehicle-for-hire badges).
The Waymo vehicle is a plug-in hybrid electric vehicle and can be identified as such by the “eHYBRID” badge on the rear liftgate, the charge port door on the driver side featuring the same “e” leaf logo, and a unique engine cover as shown.
Two physical copies of vehicle owner information, vehicle registration, and proof of insurance are stored inside each driverless vehicle. Each of the following locations contains the same sets of documents, and either set of documents can be accessed in the event law enforcement requires this information:

1. **In a container affixed to the front driver-side sun visor**

2. **In a container affixed to the front passenger-side sun visor**
The Waymo vehicle is fully self-driving.

- It is validated for driverless testing and operation.
- It is capable of performing the entire dynamic driving task within its operational design domain, as a Level 4 automated driving system under SAE International’s Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles, standard J3016.
- It is capable of performing a safe stop, known as achieving a “minimal risk condition,” without any expectation that a human will need to intervene.
- It is equipped with redundancies for critical systems, such as sensors, computing, steering and braking, and can automatically detect changes to the vehicle or the environment and determine an appropriate response to keep the vehicle, its passengers, and other road users safe.
The Waymo vehicle is intended to operate in the following conditions:

- On roadways including freeways, highways, city streets, and rural roads with posted speed limits up to 65 mph
- In parking lots
- At all times day and night
- In light rain and fog

Conditions that limit driverless operations include:

- Inclement weather including heavy rain and snowy/icy conditions
- Flooded roadways
- Mountain roadways
- Offroad

Waymo vehicles can only be operated without a driver in specific geofenced areas, where they have been tested and validated to safely perform all the dynamic tasks of driving without human intervention.

- This territory will be expanded incrementally over time via our rigorous testing and validation process.
- Information relating to these areas is provided by Waymo directly to state and local authorities, prior to any driverless operation.
The Waymo vehicle uses its sensors to identify police or emergency vehicles by detecting their appearance, their sirens, and their emergency lights.

- The Waymo vehicle is designed to yield as appropriate to these emergency vehicles no matter which direction they are headed.

If a Waymo fully self-driving vehicle detects that a police or emergency vehicle is behind it and flashing its lights, the Waymo vehicle is designed to pull over and stop when it finds a safe place to do so.

- The vehicle can unlock the doors and roll down the windows for Waymo’s Rider Support team to communicate with law enforcement. Rider Support can also be reached by pressing the Help button in the interior console accessible from the second row passenger seating area.
- Waymo’s Rider Support specialists have protocols for interacting with any vehicle passengers in the event of the vehicle being pulled over or involved in a collision, by providing information through in-vehicle speakers, on the in-vehicle displays, and communicating with passengers through in-vehicle telecommunications capabilities.
- A Waymo support team will be dispatched to provide on-scene support, when needed, for passengers and first responders.
The Waymo vehicle is capable of detecting that it was involved in a collision. The vehicle will then brake until it reaches a full stop and immediately notify Waymo’s Fleet Response specialists.

- Waymo’s Fleet Response will call 911 if the circumstances warrant (e.g., where there is a significant collision in which police may be needed because of injuries, vehicles blocking traffic, etc).
- A Waymo support team will be dispatched to provide on-scene support for passengers and first responders.
- The Waymo fully self-driving vehicle will react differently depending on the collision severity. In the event an airbag is deployed, the base vehicle’s engine and hybrid drive will be disabled.
Approaching, Disabling, and Towing
The vehicle will not self drive while any of the following are true:
- Any airbags are deployed
- Any door is open
- The vehicle is in Park (page 15)
- The Parking Brake is applied (page 15)

Open a door of the vehicle to prevent the vehicle from self driving
- Break a window if doors are locked and immediate entry to vehicle or ventilation of passenger compartment is necessary.
- Call Waymo (1-877-503-0840) to unlock the doors remotely if there is time and there are no signs of battery heating, smoke, or fire.

Keep at least one door open until the base vehicle is turned off (page 17) or the 12 V cut loop under the hood is cut (page 22).

Vehicles can roll or move regardless of self-drive state. Always use standard precautions including wheel chocks.
To determine if the vehicle is in Park or the Parking Brake is applied, approach the vehicle from the driver’s side and check for:

- Blue “P” (Park) indicator on the Electronic Shift Control
- Red light on the Parking Brake

The Electronic Shift Control and Parking Brake cannot be manually controlled while the vehicle is in self-driving mode. See page 16 to disable self-driving mode.

NOTE: Base vehicle 12 V power must be functional to shift in or out of Park or apply or release the parking brake.
Emergency responders needing to disable self-driving mode should contact Waymo using one of the following methods:

- **Call 1-877-503-0840**; or
- Activate in-vehicle Rider Support by pushing the “Live Help” button on the ceiling in front of second row seats.

Identify the vehicle by license plate and location to the Waymo representative and request the vehicle to be authorized for manual mode.

Follow the Waymo Representative’s instructions, which will include pressing cruise control buttons on the steering wheel.

NOTE: Successful transition to manual mode can be confirmed by attempting to turn the vehicle on or off or change gears. If gears can be changed or the vehicle can be manually turned on or off, the vehicle is not in self-driving mode.
Lights above the start-stop button indicate when the vehicle is running (RUN) or when it is off (OFF).

**The Start-stop button will not turn the vehicle off while self-driving mode is enabled.**

**To turn off the vehicle:**
1. Disable self-driving mode (page 16)
2. Push the start-stop button until "OFF" is illuminated in the button surround

If the button does not turn off engine:
- Ensure self-driving mode has been disabled
- Cut the 12 V cut loop to disable propulsion system (page 22).

**NOTE:** A faint buzzing may be heard from the 1st row center console when ignition is turned off or front 12 V power is cut.
After disabling self-driving mode and shutting the vehicle off, the vehicle can be towed like any conventional front wheel drive vehicle (dolly tow with parking brake released and front wheels off the ground). If the parking brake cannot be released or a dolly tow with front wheels off the ground is not available, the vehicle should be placed on a flatbed truck for removal. Please use caution to avoid damaging sensors. See page 36 for post-incident handling precautions.

NOTE: In emergency situations, push bumpers may be used to move the vehicle from the roadway, though sensor damage will likely occur.
Opening the Rear Trunk

To access the trunk:
1. Disable self-driving mode (page 16)
2. Pull the exterior handle or press the liftgate button on the front row overhead console.

**NOTE:** The rear liftgate latch is electrical and will be inoperable when in self-driving mode or if base vehicle 12 V power is removed.
Vehicle Systems
Safety Considerations
Emergency Disabling Electric Power

The vehicle contains two 12 volt and one high voltage (HV) power source:

- 12 V power is supplied by the base vehicle’s 12 V battery and a separate, isolated 12 V battery that powers components of the self-driving system. Both batteries are located in the vehicle’s trunk.
- The vehicle’s HV battery system powers the hybrid propulsion motor as well as the self-driving components located in the vehicle’s trunk.

To disable electric power:

- See page 22 to disconnect the base vehicle's 12 V battery and disable the HV battery by cutting the cut loop located under the front hood.

  NOTE: The rear liftgate latch is electrical and will be inoperable after the base vehicle's 12 V power is disconnected

- If the vehicle is inverted or hood access is blocked, turn vehicle off (page 17) then cut the base vehicle negative battery cable located in the trunk (page 23)
- See page 24 to disconnect the isolated 12 V battery
- See page 25 to disable HV power using the Service Disconnect
Cutting the 12 V Cut Loop will shut down the base vehicle and will disable the HV Battery.

To cut the 12 V Cut Loop:
1. Open hood. Hood latch release is located to the left of the steering wheel at the base of the lower dash panel.
2. Remove fuse box cover.
3. Cut and remove a segment of the 12 V positive power supply cable. This cable is marked with a label designating the cut locations. Make a cut at each side of the cable label and remove the segment.
4. Protect the cut ends from arcing against metal parts.
If the vehicle is inverted or hood access is blocked, the base vehicle's 12 V battery can be disconnected at the battery, which is located in the trunk.

1. Turn vehicle off (page 17)
2. Open rear trunk (page 19)
3. Disconnect or cut and remove a segment of the base vehicle negative battery cable

**NOTE:** If base vehicle 12 V power is disconnected at the battery rather than under the front hood and HV contactors have experienced damage, the 12 V system may still be powered via the auxiliary power module (APM). To ensure power has been removed to 12 V systems including passive restraints, also disable HV power using the Service Disconnect (page 25).
An additional isolated 12 V battery located in the trunk powers the self-driving components. To disconnect this battery:

1. Open the rear trunk (page 19).
2. Disconnect or cut and remove a segment of the negative battery cable

Note: Disconnecting this battery does not disable HV power or 12 V power to airbags.
Disabling High Voltage Output from the HV Battery

The Service Disconnect is under a cover located between the 1st and 2nd row seats. Removing the service disconnect will disable HV output from the HV battery system.

**Emergency Disabling of Low and High Voltage Power**

If possible safely

Remove the Service Disconnect. This will disable High Voltage output from the battery.

1. First: Uncover the Service Disconnect access cover.
2. Second: Unbolt the cover panel over the Service Disconnect.
3. Third: Remove the Service Disconnect.
4. Fourth: Reinstall the cover over the empty socket and replace the carpet.

The Service disconnect cover is between the 1st and 2nd row seat.

**Wait 5 minutes**

This will allow the HV capacitors to discharge under most circumstances. However, under some circumstances the HV Battery System HV Contactors may not open. Consequently, HV may not be contained to within the HV Battery System.

Personal Protective Equipment (HV qualified Gloves, Boots and Coat) provides protection against Live HV.

**Warning:** Personal Protective Equipment must be used by First Responders when addressing a damaged Chrysler Pacifica Hybrid.
Wet Location Considerations

A vehicle submerged or flooded with water can result in protective system failures.

Excessive heat and electrolysis may take place resulting in byproducts of hydrogen and oxygen. In salt water chlorine is also a byproduct. These byproducts, trapped and concentrated by the passenger compartment, a garage, or other containment, may be in concentrations that could be explosive or corrosive and could have adverse effects on human health. Action should be taken to assure ventilation of a partially submerged vehicle and any space in which it is contained.

A vehicle without impact damage has HV contained to within enclosures or insulation and has HV isolated from the chassis, therefore electrical shock hazard risk is minimal. A submerged or flooded undamaged vehicle has a low electrical shock hazard risk.

A vehicle with impact damage presents an increased electrical shock hazard risk. If HV is open to the environment you must stay away from damaged HV components.

**Warning:** First Responders must use proper Personal Protective Equipment when addressing a damaged Chrysler Pacifica Hybrid vehicle.
Fire Fighting Considerations

Fighting electrified driveline vehicle fires poses unique challenges.

- Never cut, pierce or damage any high voltage component as serious injury may result.
- Chemical extinguishers and oxygen denial are not effective in these fires.
- Deluge with water delivered via fire hose at the maximum possible distance is the recommended practice to contain the fire and cool the reagents, minimizing risk of spread and risk of toxic emissions. This should continue after extinguishment until the pack is cool.
- Application of large amounts of water should begin at the first signs of battery smoke as water may absorb some harmful toxic emissions in the smoke.
- Ventilation of the passenger compartment, if occupied, is essential at the first sign of battery heating, smoke or fire. Batteries should be thermally assessed during initial operations and throughout rescue and remediation efforts.
- Damage, abuse, flooding or exposure to heat (such as from a vehicle fire) can initiate thermal reactions which will advance to a significant fire in lithium ion power systems.
- The Battery thermal reactions become self-sustaining at higher temperatures due to the emission of oxygen from certain constituents.
- Ongoing battery fire or heat production can facilitate the re-ignition of combustible automotive components above and adjacent to the pack.
- Lithium-ion automotive batteries can reignite due to ongoing reactions from internal heat.
- For any battery thermal event, NFPA recommends SCBA be required within fifty feet.

Rescue of persons at risk and containment of the fire with prevention of toxic gas emissions should be the goals of fire-fighting efforts.
Extrication Considerations

Impact event emergencies can require the extrication of victims from damaged vehicles. Determination of the need to extricate and timing must be made by incident command based on standard response practices and procedures.

When victims can be removed safely from an electrified driveline vehicle, it may be prudent as consequences of damage to high voltage components may evolve over time.

Potential related hazards to vehicle occupants, beyond medical condition and typical automotive impact event hazards will include:

- Fire, which is sustained by heat from a damaged battery or shorted wiring
- Exposure of high voltage potentials from damage to the isolated HV system
- Toxic gaseous emissions from a thermally active damaged battery
- Vehicle stability, or the lack there-of. Lift points indicated on page 35 should be used to immobilize the vehicle when possible before extrication activities.

⚠️ Decisions to extricate must take into account the balance between medical condition and hazard from the state of the vehicle.

Damage to fuel systems, potential hot coolant lines, all high voltage electrical components and cables, the batteries, and potentially active restraint systems must be avoided at all times. See the following pages for location information. (The “Do not cut” illustrations)
Passive Restraint Device Considerations

Restraint Systems:

- Front seat belts with pretensioning devices (horizontal cylinder below the belt spool)
- Driver and front passenger air bags, seat-mounted side bolsters and leg bolsters
- Side curtain air bags
- Impact sensors
High Voltage Devices

Stored HV energy in the HV Battery System (1) is provided to the ‘PIM’ Power Electronics (2) and delivered as three phase AC power to the Electric Motors for propulsion. The stored HV energy is used by other vehicle components including:

- The ‘EAC’ HV Air Conditioning Compressor (3)
- The ‘BCH’ Battery Coolant Heater (4) which maintains battery temperature
- The ‘APM’ auxiliary Power Module (5) that charges the 12 volt low voltage system & battery

When plugged in, the HV power is supplied by the ‘OBCM’ On Board Charging Module (6)
Base Vehicle Electrical Considerations

High Power Electrical Systems:
- High Voltage Cables
- High Voltage Components
- High Voltage Battery
- Low Voltage (12V) Battery and Cables

DO NOT CUT OR PIERCE HIGH VOLTAGE DEVICES

Manual Battery Service Disconnect

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High Power Electrical:
- High Voltage Components & Cables
- Low Voltage (12 V) Batteries & Cables

Due to the addition of HV components in the trunk, a submerged or flooded vehicle presents an increased electrical shock hazard risk, responder should stay away from trunk HV components.

DO NOT CUT OR PIERCE HIGH VOLTAGE DEVICES

There are no changes to procedures to disable HV power (page 25).
Base Vehicle Fuel and Fluid Systems Considerations

Fuel and other Fluid Systems:
- Gasoline Fuel Tank and Fuel Lines
- Brake and Power Steering Reservoirs
- Radiator and Cooling System

DO NOT CUT FUEL TANK, FUEL OR COOLANT LINES

Excerpt from FCA Guide
See page 34 for additional fluid considerations specific to the Waymo Self-Driving System
Avoid cutting self-driving coolant lines except when necessary. Coolant contains 50/50 Ethylene Glycol (Antifreeze)/Water and may be flammable at high temperatures.
The areas illustrated are recommended lift and cut zones on the vehicle. Determination of actual lift and cut points must be made by incident command based on the unique situational factors such as possible relocation of the hazards illustrated on the preceding pages as a result of impact events. These are only recommendations.
Following initial response, certain actions and precautions are necessary. If air bags have deployed, the vehicle cannot be driven again until repaired, as air bag protection will not be available to occupants in the event of a collision. After any collision, the vehicle should be taken to an authorized dealer immediately.

While the Pacifica HV battery is designed for safety, industry-wide experience has demonstrated that the unlikely possibility of delayed ignition or re-ignition of a damaged battery must be considered in post-incident handling. Any battery exposed to accident forces sufficient to deploy air bags or to a vehicle fire requires special precautions until verified as undamaged.

- The vehicle or battery pack must not be stored inside an occupied structure.
- Adequate ventilation must be present at the storage location to prevent buildup of any outgassing.
- Batteries to be recycled must be shipped in accordance with regulations governing the transport of damaged lithium-ion batteries (and never by air).
- Thermal monitoring of any damaged, flooded or burned battery should be performed during storage.
- The manual battery Service Disconnect must not be reinstalled by other than an authorized technician.
- The Service Disconnect socket must be covered/sealed to prevent water or debris entering the battery.

The battery pack in this vehicle uses non-spillable lithium-ion cells, and it is unlikely that electrolyte, which is clear, will escape from the pack in the event of damage. Liquid emissions from damaged packs are typically colored battery coolant, which should be addressed in the same manner as spilled engine coolant.

Do not apply chemical neutralizers used for other battery types or take any other action which could result in battery cell contents being aerosolized.

Do not ingest, inhale, or make bare skin contact with any internal material from the battery cells. In the event of accidental contact of this nature, wash exposed skin thoroughly with soap and water for at least 5 minutes and seek medical attention. In the event of ingestion, seek emergency medical care immediately.