Units Dispatched: **E + (T or R)**

GENERAL

Fire department responses to automobile fires have become increasingly oriented toward providing for firefighter safety as components used in the construction of automobiles have become more varied and hazardous when exposed to fire. Firefighters can place themselves at unnecessary risk when they fail to realize that with most auto fires, the car's value has been diminished to the point that it will be deemed irreparable by the insurance company and, thus, not worth the risk of an overly aggressive attack. Rig positioning, direction of fire attack, sequential tactics, and proper usage of PPE will provide firefighters the greatest margin of safety while extinguishing automobile fires.

Pay close attention to placarding on a vehicle indicating that it is transporting a hazardous substance. A placard could be as simple as the letters CNG in a diamond (indicating that the vehicle is powered by Compressed Natural Gas) or E85 (Ethanol fueled). More complex placards include an NFPA 704 Diamond or chemical identification number. Refer to the DOT Guidebook when dealing with fires involving hazardous materials. The Hazardous Materials Team may also be contacted via phone or requested to the scene for technical assistance.

The vast majority of the vehicles used by UW-Milwaukee are CNG powered. Even though vehicles powered by CNG are designed with pressure relief valves in place to prevent BLEVEs in the compressed natural gas cylinder during a fire, numerous instances of relief valve failures have been documented. In addition, many street racing vehicles and/or "muscle cars" contain Nitrous Oxide (NO) cylinders. CNG and NO cylinders are typically, but not always, found in the trunk, in the truck bed, or under the back seat of the vehicle. If the cylinder does BLEVE, a massive, instantaneous, and catastrophic explosion occurs, leaving the vehicle resembling those often pictured after a car bombing. Structural members and mechanical parts have been found several hundred feet from such explosions. Be sure to clear civilians from the area and launch the initial fire attack from a distance. This would be an ideal usage for the deck gun.

Verify immediately if individuals identifying themselves as having been in or near a vehicle fire are in need of EMS and request backup as needed. Perform searches and rescues as outlined below.

Primary Search: A rapid interior search for potential victims in an immediately dangerous to life or health (IDLH) atmosphere. Coordinated tempo and pace are primary considerations while the danger is being mitigated.

Secondary Search: A complete and systematic search of the entire IDLH area and possibly affected (surrounding) areas after the danger is confined/controlled. Attention to detail and thoroughness are primary considerations. When possible, secondary searches are to be completed by different companies than those which performed the primary searches.

Final Search: A complete and systematic double-check of the entire IDLH area and possibly affected (surrounding) areas after the danger is controlled. Attention to detail and thoroughness are primary considerations. When possible, final searches are to be completed by different companies than those which performed the secondary searches.

Rescue: The removal of unconscious, incapacitated, or immobile potential victims from IDLH and affected areas.

After each search is completed by the designated search and rescue teams, company officers in charge of each search and rescue area must report the results of the search [victim(s) found, or all clear] to Operations via radio on the fireground talk group. The Incident Commander will relay this message to dispatch via radio.

At the conclusion of an auto fire, the Engine HEO should gather as much information as possible for the EIS report: License plate number with state and expiration tag, Vehicle Identification Number (VIN), Year, Make, and Model of vehicle, and Owner name, address and phone number.

At no time shall members who are actively engaged in firefighting, or support activities, in the immediate area around the burning vehicle be wearing their traffic safety vest. This diminishes the rating of your NFPA approved PPE. Members not in the hot zone, but in vehicle traffic areas shall have their traffic safety vest donned.

Request the Fire Investigation Unit if damage is estimated above $10,000.00 or involves a significant injury or fatality. Request 10-53 to assist with investigation and the securing or towing of the vehicle at the completion of our duties. Do not allow bystanders to remove items from the vehicle until the fire is completely extinguished and 10-53 are onscene to verify ownership.

Auto fires occurring on the Freeway system, particularly in the upgraded Marquette Interchange, offer different challenges and require different resources. Review and understand Training Video 2009-M (Marquette Standpipe System) as well as our Freeway Response policy, which details communications, staging, and water supply operations on our freeway system.

In rare cases, large petroleum tanker fires are reported as auto fires. If this is the case, request a *Full HazMat* assignment and consider an ARFF Crash Truck from the Milwaukee County Fire Department, stationed at Mitchell International Airport.

Of tactical interest, the Milwaukee County Fire Department's Rescue 3 is able to enter low-clearance parking garages at the Mitchell International Airport to provide initial fire attack. In this case, we would support their attack and provide a water supply. In other parking structures, as in the downtown and other areas around the city, note the presence and location of standpipes. Utilizing the standpipe will speed the application of water to an auto fire on an upper level (consider the length of the hoselay without the standpipe). If no standpipe is available, consider using the pre-piped waterway of the aerial ladder as an external standpipe to deliver water to an upper level.

Auto fires in underground parking structures beneath commercial or residential occupancies present smoke challenges. The Engine Officer should use the TIC to help locate the burning vehicle in dense smoke conditions. Attempt to determine if the HVAC system will assist by removing smoke to the exterior or if it will draw the smoke deeper into the building. Floors above the underground parking structure will need to be checked for trapped smoke. Request additional resources for search or smoke removal as needed.

ENGINE

OFFICER Tools: Full PPE with SCBA, portable radio, flashlight, TIC, halligan tool Duties: Initiate Command, direct apparatus placement, V-Tac, begin size up and extinguishment
HEO Tools: Full PPE, portable radio, wheel chock Duties: Engine and pump operations, gather information
NOZZLE Tools: Full PPE with SCBA, portable radio, axe Duties: Nozzle and hoseline operation
BACKUP Tools: Full PPE with SCBA, portable radio, 6' pike pole, flathead axe, multipurpose dry chemical extinguisher Duties: Hose control, extinguisher operation if needed, search for occupants

Protection of personnel usually begins with proper positioning of the apparatus. Upon arrival, the HEO should position the rig uphill and upwind of the burning automobile while shutting down any flow of traffic to the area in which firefighters will be operating to extinguish the fire. Be sure to not park underneath any wires that may extend over the burning vehicle. It is understood that it may not always be possible to accomplish all of these priorities based on burning vehicle positioning, parked vehicles, road design, or other factors. The first priority is to control the flow of traffic, leaving the Engine parked at least two to three sections away from the burning vehicle. Leave the Engine's wheels turned away from the incident in case the Engine is struck by another vehicle. Use rig positioning and cone placement to augment HEO safety while at the pump panel. Once the tank water

is committed, preview the locations of the nearest hydrant in case additional water is needed.

The Officer should perform a size-up and radio report, taking initial command. Request 10-53 early if traffic control is an issue. Ensure the rig V-Tac is set to the proper incident talk group. Observe fire conditions, window failures, and previously open doors to assist in the subsequent fire investigation. If overhead electric wires are involved and in danger of failing, request We Energies electric via dispatch and advise them that the wires are impeding firefighting operations. If a downed electrical line caused the auto fire or is in contact with the auto, consider the auto to be energized. Protect exposures and update We Energies-Electric via dispatch of the need for an upgraded response.

Do not rush to return the Truck Company to service, as all areas of the vehicle will need to be accessed prior to the end of the assignment. In some cases, *AUTOF* assignments occur as a result of an attempt to cover up a crime. Truck Companies provide a critical forcible entry capability to ensure that no victims or illegal substances were hidden in the vehicle prior to the fire. The Engine Officer may transfer command to the Truck Officer on the Truck Company's arrival, although this is not absolutely necessary. In many cases, the Truck Company will provide tactical support and then be free to return to service, in which case the Engine Officer retains command.

Firefighters operating in the hot zone or in smoke shall employ their SCBA with facepiece.

Many MFD Engine Companies are equipped with a bumper mounted reduced line, typically stocked with two 50' sections. Resist the urge to rely on this as your initial attack line. Instead, use the left-rear discharge, as this line will generally allow for the instantaneous addition of foam to the fire stream (utilizing the air aspirating foam tube), and permits you to lengthen the distance between the Engine and the burning vehicle. On large vehicles or vehicles remote from the hydrant system, as on expressways or in large parking lots, employing AFFF/ATC on the initial attack will make your attack more effective and efficient.

The Nozzle FF shall operate the SM-20 nozzle with the Backup FF dressing the hoseline and providing support. The SM-20 nozzle is recommended as it will support a foam operation when needed. A minimum of 3 – 50' sections of hose shall be used for car fire attacks; this provides ample length to reach all areas around the vehicle without forcing firefighters into the dangerous areas immediately in front of or behind the burning vehicle. The Backup FF shall keep the hoseline out of any burning or non-burning petroleum run-off during the fire attack. Initial cooling shall be from a safe distance until the fire is reduced in size and intensity. The Nozzle FF, while cautiously moving in for a more direct attack, should flush the ground near the vehicle to push any petroleum product away and to cool the fuel tank. Stand to the side of the vehicle and behind the hood area, using the reach of the stream to stay out of the hazard areas created by exploding bumper or hood/trunk support struts. Given an engine compartment fire, direct the stream, or multipurpose dry chemical agent, initially into the small gap between the rear of the hood and the bottom of the windshield. This will not fully extinguish the fire, but will allow steaming and cooling to begin.

As the hoseline is brought into closer proximity to the burning vehicle to complete extinguishment, ensure that fire within the passenger compartment or rear of the vehicle is

adequately knocked down from a distance. Trunk and hatchback struts can react just as violently as hood struts and should be similarly respected. Also, the interior of the doors, the dashboard, roof, and all roof support posts shall be cooled to prevent any stored gas cylinders used in the activation of airbags from catastrophically failing.

Magnesium components are being used more frequently in the design of newer vehicles to decrease the weight of the car for fuel efficiency without sacrificing strength. Typical areas of the auto where magnesium is used include engine blocks, steering columns, power trains, exhaust components, brackets, seat frames, brakes, and even structural framing components. Magnesium can react violently as water is applied, initially intensifying the heat and producing a bright, white light. The only effective extinguishing agents for Magnesium are a Class D dry powder extinguisher or an abundant supply of dry sand. In lieu of these specialized agents, copious amounts of water, applied from a safe distance, will eventually cool the Magnesium below its ignition temperature.

Explosions from heated vehicle batteries and any items being carried in the vehicle are ever-present hazards. These hazards further necessitate the usage of SCBA at all times during vehicle fire extinguishment, not only as a means of respiratory protection but also as a means of reducing traumatic facial or eye injury from flying debris.

After initial cooling has occurred, the Officer can pry up the rear-most corner of the hood (or forward most corner of the trunk lid) so that water can be directly applied to the nearest strut to prevent catastrophic failure and provide for more complete extinguishment. Additionally, the Nozzle FF should crouch down and direct the firestream into the wheel well area and up and behind the front bumper area (or rear bumper area), preventing catastrophic failure of the bumper as a result of the bumper struts heating up and exploding. Move around the vehicle to cover both sides equally. At this time, the HEO could ready a wheel chock for the Backup Firefighter to place on the downhill side of one of the wheels if the burning vehicle is parked on a steep grade.

At no time prior to, or during, engine compartment or bumper area cooling shall firefighters cross in front of or operate in front of the burning end of a vehicle. Once cooled, the Engine Officer or Truck Company personnel can begin working on either conventionally forcing the hood or trunk locks or cutting them open with a saw.

Once the fire has been adequately knocked down, the Backup FF shall use the 6’ pike pole to perform a primary search of the passenger compartment. **This primary search is to be initiated as soon as possible as designated by the incident commander.**

Vehicle fires can steam for a long time after extinguishment due to the amount of heat held in the many metal components. In some cases, plastic fuel tanks can melt and send a stream of burning fuel flowing away from the vehicle. Control the burning with foam, then contain what is practically absorbed with onboard Oil-Dry. In some cases, small flaming drops of fuel may be observed dripping from the underbody of the burning auto and direct application of water and foam appear to have little effect. Consider using a multi-purpose dry chemical extinguisher applied in and around the area of the drip. Some fuel tanks can be accessed by removing the rear seats. Ensure that complete extinguishment has occurred prior to leaving the scene.

If a fuel spill following an auto fire is beyond the onscene capabilities, but under 25 gallons, request HazMat 2 to the scene via dispatch. Fuel spills or diesel spills (as from a semi-tractor's saddle tanks) which are in excess of 25 gallons necessitate a *Limited* or *Full HazMat response*.

TRUCK

OFFICER Tools: Full PPE with SCBA, portable radio, flashlight, TIC, halligan tool Duties: V-Tac, May assume Command, oversee support duties
HEO Tools: Full PPE with SCBA, portable radio, wheel chock, Porta-Power spreaders Duties: Forcible entry as needed
VENT Tools: Full PPE with SCBA, portable radio, axe, metal saw (aluminum oxide blade) Duties: Forcible entry as needed
FORCE Tools: Full PPE & SCBA, portable radio, flathead axe, pliers Duties: De-energize vehicle, search for occupants

Upon arrival, the Truck HEO should position the rig to augment traffic control for the protection of firefighters working at the *AUTOF* assignment. The Truck Officer should confer with the Engine Officer and may assume command if necessary. The Truck Officer shall monitor the fireground talk group on the rig radio and the Dispatch talk group on the portable radio while approaching the scene. Ensure the rig V-Tac is set to the proper incident talk group.

Firefighters operating in the hot zone or in smoke shall employ their SCBA with facepiece.

At no time prior to, or during, engine compartment or bumper area cooling shall firefighters cross in front of or operate in front of the burning end of a vehicle. Once cooled, the Truck Officer will oversee forcible entry operations in conjunction with the HEO and Vent FF. This may include utilizing the trunk and/or hood release latch, forcing the hood with the Porta-Power Spreaders, forcing the trunk lock (utilizing halligan bar), or cutting them open with a saw. If the owner is available, request and try the vehicle's keys to gain access if able. Once the hood is open, ensure it will stay open by using the rod in the engine compartment or by bending the hood support bar near the hinge-point with the fork of the halligan bar.

The Vent FF can further support the Engine Company operation by opening vehicle doors and accessing void areas to perform a secondary search for occupants, and to search for hidden fire. The secondary search is to be initiated after the danger is confined/controlled as designated by the incident commander or Operations Chief.

The Truck Officer and Force FF shall de-energize the vehicle by disconnecting the battery. Car batteries can be located in any number of locations in newer vehicles, including the trunk space, under the front or rear seats, or under other engine components. Caution should be used on hybrid vehicles, as tremendous amperage is carried in the electrical

cables. There are no hard and fast identifiers for such cables in vehicles. At times, they are red, orange, or yellow. Do not cut brightly colored cables or cables that are sleeved in brightly colored plastic cable protectors. In some cases, battery "OFF" switches are provided as a means of disconnecting the vehicle, but can be problematic in that their location is not universal and their functionality is suspect at best after exposure to fire. The Truck Officer and Force FF should also force entry into the trunk space to ensure that it is clear of occupants and fire.

The Truck Officer is to assist the Engine Officer with ensuring that a final search is completed and no occupants are in the vehicle. Final search and examination is to be initiated after the danger is controlled as designated by the incident commander. They will also verify complete extinguishment and removal of the vehicle's keys from the ignition (if possible) prior to returning to service.