

Emergency Response to Industry for Municipal Firefighters

By Brian S. Gettemeier

The station is alerted to a fire in an industrial facility. As your crew rolls out of the station, you can see a large black plume in the distance. You are familiar with the address and know it's a manufacturing facility, but do you truly understand the dangers ahead? For many fire departments in this country, industrial facilities are gated compounds on the edge of town that very few of us have had the opportunity to enter. Incidents at these facilities can quickly overwhelm you and your department's resources, especially if you are trying to learn about the hazards at the time of an emergency.

The typical firefighter in the United States is pretty well-versed in automobile fires, residential structure fires, and emergency medical calls. We have seen in our recent history how tried and true residential tactics have challenged the fire service when they were applied to commercial fires; unfortunately, some of these incidents have resulted in the loss of firefighters' lives.

Industrial incidents are at the pinnacle of high-risk, low-frequency incidents. Industry presents a whole new set of circumstances, challenges, and rules of engagement that many firefighters have not trained for, much less thought about. Industrial facilities vary in size from small manufacturers in a building that is tens of thousands of square feet to large facilities that rival small cities. It is vital that the fire service reach out to partner with industry to at least learn about the facility before rolling through the gate during an incident.

Meet Before the Planned Tour

The partnership must start out with a meeting where the key players from the industrial facility and the fire service organization discuss some rules of engagement. This meeting should occur before an engine company tour or training is scheduled. The purpose of an engine company tour or training at the facility is to create firefighter awareness about the unique aspects of the facility, not about code enforcement. The goal is to keep the firefighters safe during an emergency response while protecting human life and the material assets of the facility.

Fire department leadership must understand what the industrial organization expects of firefighters and clearly communicate these expectations to their members to make sure they understand them. The facility has its own set of guidelines and rules the firefighters are to honor when they come on site. These rules are there to fulfill the company's commitment to safety.

Additionally, these rules may be part of Homeland Security requirements or to protect against corporate espionage and sabotage. Firefighters are used to making the rules, but we must honor the industry's rules if we are to build a solid working relationship. You may have to attend a safety briefing prior to entering the site for a tour. During nonemergency events, firefighters may also need to provide a state-issued photo ID for security clearance.

General Rules

Some general rules of industry include the following:

No photography. Typically, all industries do not allow photography on site; if it is allowed, the photographer must follow strict guidelines. This can be difficult at times because industrial operations and emergency response equipment are very impressive. Photo policies typically apply to employees and guests.

Learn what the personal protective equipment (PPE) requirements are. Hard hat, safety glasses, protective footwear, hearing protection may be needed. Many facilities require long-sleeve cotton shirts, if not fire resistive clothing (FRC). Other facilities many require static suits to prevent static electricity. Other facilities will require clean suits to prevent any contaminants from entering the facility.

The use of cell phones is strictly prohibited. Safe work practices guard against distracted workers; this includes walking while reading e-mail and text messages. Another concern is that the phone could be an ignition source.

You may have to wear a personal air monitor. For example, hydrogen sulfide gas is a common hazard in the refinery industry. In fossil fuel power generation, carbon monoxide is a common hazard in the coal-handling areas.

During nonemergency entries, you may be asked to do the following:

Sign a nondisclosure form. It states that you will not disclose information about the facility, its operating systems, or its manufacturing process.

Limit your access to certain areas of a facility for security reasons. The reasons may include the presence of critical infrastructures in the facility's operations or to protect trade secrets. Examples would be product research labs that contain trade secrets, matters of National Security when it comes to nuclear facilities, or areas vital to continued production, for example operations control rooms or computer server centers.

Go through metal detectors or explosive sniffers.

Be searched on the way in and the way out.

Observe behavioral restrictions on its outside properties. Industrial facilities control their entire property, including the visitor's parking lot. Many companies ban employees, contractors, and guests from bringing alcohol, drugs, and firearms on their premises.

Unified Command

It is imperative that the command staff be part of the meeting discussions and the facility tour. The incident commander (IC) must have an idea of the hazards and challenges firefighters may face while fighting a fire at an industrial incident. In large-scale incidents, the command representative will be part of the unified command staff. If the facility has an emergency response team, the fire department will not be in charge at a large-scale incident; it will be part of a larger command staff body. It is imperative that you understand that the facility's team is a part of an integrated operating principal for the safety of the stakeholders and continued operations.

During unified command, all key players bring their knowledge and resource list to the table to develop a safe strategy and tactics plan for successful mitigation through a cooperative effort of all key stakeholders, which includes the facility's emergency response personnel, your fire department, and others.

The benefits of unified command and its success played out June 29, 2019, in Philadelphia when a refinery fire was successfully mitigated. Less than 24 hours prior to that incident, key players had met for an interagency meeting to discuss roles and responsibilities. There is no doubt that the preincident meeting had reduced some of the confusion created by an incident of that magnitude. The decision making of the fire department's IC must take into consideration the current plant operations and the plant's recovery from the incident. A breakdown between the command staff and the facility can pose a safety threat.

Communications

The IC should identify the key subject matter experts on site. The industrial hygienist can be an excellent resource when it comes to hazardous substances. There may be process liaisons who might have advanced knowledge on key hazards and mitigation methods for a particular area. The maintenance group knows how the equipment works.

In a multiagency, multidiscipline incident, how will units communicate with each other? Great strides have been made since September 11, 2001, to create interoperability between responders, but there still are gaps. One of them exists between industrial and municipal responders. The time to create a communications plan is well before the incident.

Public information officers (PIOs) must coordinate media releases with the facility's corporate communications group. Large-scale incidents have all the key components for media interest--multialarms, high hazards, dramatic smoke footage. We must respect the interests of the stakeholders when providing information to the media, especially when it comes to life safety or environmental issues.

Production at the Facility

The complexity of manufacturing is not a simple on-or-off process. Halting production takes time. Machinery must be safely brought offline and left in a state where production can occur again. This process can take a couple of minutes or a couple of hours. For example, an aluminum manufacturer in the Midwest had an explosion that prevented a typical shutdown procedure. This resulted in molten aluminum cooling in molds. Ultimately, the factory never recovered from the incident. Although several economic factors went into the decision to halt production at the facility, this incident became the catalyst for the facility's closure. This facility's closure resulted in the loss of good manufacturing jobs, which had an economic ripple effect through an entire community. Ultimately, this ripple effect included a loss of tax revenue for the community.

We must understand that industry is there as a for-profit organization to provide goods and services. It is not uncommon for large industrial facilities to continue with production during an emergency event, including a fire. If the facility can continue production without interfering with firefighting operations, it will. This means firefighters may have to contend with the noise and moving machinery during firefighting operations. In fact, it might be safer for the facility to operate instead of shutting down. Production start-up and shutdown can be vulnerable times for an industrial facility, as equipment heats up or cools down or as process units that normally operate above a product's upper explosive limits have to travel through the explosive range during a shutdown process.

IC staff and plant personnel must have an understanding well before an incident of what continued operations and a safe shutdown look like. Firefighters are used to having control of a structure during operations, everyone evacuated, and utilities under control. That is not the case in industry. ICs should realize the importance of continued production and know what that will entail. For example, in power generation, hydrogen is used as a cooling gas. During the proper shutdown procedure, there will come a time when the hydrogen will have to be vented. This can become very unnerving for ICs if this is the first time they heard that this must be done during a fire incident. No ICs want highly flammable gas floating around their scene. It takes a delicate balancing act for the IC to meet the needs of the customer while maintaining the life safety of the firefighters. A relationship and preplanning are paramount to meeting safety needs and the other needs of both organizations.

Likewise, as the emergency operations are wrapping up, the facility will immediately begin recovery operations to begin to restart if possible. ICs must work with facility operators to determine the best tactics to assist in the facility's getting back online. The fire service is great about customer service and property conservation, but this level far exceeds what we are used to.

General Facility Layout

When arriving at a facility, it is always beneficial to have someone there escort emergency services to the emergency area. Industrial facilities are complex, and personnel can quickly find themselves lost or in a place where they should not be.

Are there streets within the facility? Do the streets have names? Oftentimes, you will find that numbered streets run in one direction and alphabet lettered streets run in the opposite direction. For example, numbered street may run east and west, and lettered streets may run north and south. Columns inside the structure can be labeled the same way--a row of columns labeled with letters is going one way across the structure, and a row of number is going the opposite way. Each column will have a letter and number designation.

Are the building and the process units laid out in floors, grades, or grades above sea level? Many industrial facilities are laid out in tiers based on equipment needs. Sometimes, there may be a half floor between two levels. Other times, one may travel 20 feet or more vertically before the next elevation. To combat the confusion created when labeling a structure by floors, some facilities use a grades-above-sea-level approach. For example, if the ground floor of a facility is 411 feet above sea level, the ground floor would be known as "Grade 411." If you traveled 10 feet up to the next floor, that would be "Grade 421."

Compass directions are also used in facilities. It can be challenging for someone who is directionally challenged when told to proceed to the east side of the structure. This can be further challenging because facilities use an orientation known as "Plant North," which will be slightly off from the north with which we are familiar. Plant North assists in the day-to-day operations of the plant for orientation, but it does little for incoming responders, as we are off by a couple of degrees.

Industrial facilities are complex. Understanding how a facility is laid out can help you to identify where you are or where the incident is. Furthermore, it will help if you understand some of the plant lingo when you are told, "The incident is on the Plant North side of the structure or on Grade 562."

Fire Protection Systems

Fire protection systems are larger and more complex than those typically encountered in a standard commercial occupancy. Fixed facility fire pumps can far exceed the pump capacities and pressures of our pumpers. Attaching a pumper to a hydrant of a fixed facility to supply a fire department connection will do nothing more than create friction loss. It is not uncommon to have multiple fire pumps at large industrial facilities to serve as backups if a primary pump is lost.

The fire detection systems are far different from those we learned about in the Fire Academy. Incipient detectors are typically found in computer rooms and electrical rooms to detect the slightest hint of a breakdown in the insulation of a cable. This detection system consists of a ring of copper or PVC pipe looped around a room in the same way as a sprinkler system. Small ports throughout the piping draw in a small sampling of air. This air is analyzed by the system and creates an alarm if there is a slight indication of a thermal breakdown of a

component. Responders enter the room with portable detectors to identify the potential equipment fault.

A linear heat detector is a two-wire system encased together that can be looped around the ceiling of a room or travel above the entire length of a conveyor belt. When heat is detected, the wires melt together and signal that there is a fire. The system is sophisticated enough that it will indicate how many feet into the length of the detection wire the fire occurred.

Fire Suppression Systems

Firefighters are used to seeing wet pipe sprinkler systems and occasionally run across a dry pipe system. A fire academy typically discusses deluge systems as protecting against high hazards with a series of sprinkler piping with open heads. A deluge system is tripped off by a detection system. Once the detector trips, the deluge valve opens, and water is sprayed out of every sprinkler head.

Very few of us have learned about pre-action systems. The system design is virtually the same as that of a deluge system except that the sprinkler heads are equipped with fusible links. A detection system activates, opening the clapper valve on the sprinkler riser, filling the sprinkler pipes with water. The fusible link of the sprinkler head must melt out before it activates and discharges water. Its advantage is that the facility has a dry pipe sprinkler in areas where freezing is a concern. The sprinkler system requires two actions to activate. We have all been to a warehouse where a forklift has sheared a sprinkler head. With a pre-action system, if a forklift shears a head, nothing will happen because the sprinkler valve is still held in place because of the detection system, not water or air.

Pre-action and deluge systems can be manually activated at the sprinkler riser. You must find the riser location and the area of protection a riser goes to. Large facilities may have multiple risers in a single location that branch out to protect different areas of the facility.

Fighting fires in a sprinkler building can be challenging. Many firefighters are used to the hot, turbulent smoke, which is under pressure and wants to exit the structure. Smoke in a structure with a sprinkler activation will be cooled down and will become lazy. In the case of storage and warehouse spaces, materials will begin to soak up water. This additional weight might exceed the weight rating of storage shelves, resulting in failures. A sprinkler system may control, not extinguish, a fire. You may have to enter the structure to extinguish the fire.

Big Water

Big water is a very popular instructional topic in the fire service today. In large industrial facilities, a typical bread-and-butter operation will demand a water supply that will greatly exceed the municipal big water operation. Municipal pumpers have pump capacities of 1,500 to 2,000 gallons per minute (gpm). Industrial pumpers are capable of flowing 4,000 gpm-plus from draft. Many of these industrial pumpers carry foam only, no tank water. Supply lines may include 7¼-inch hose or greater. A 7¼-inch hoseline is capable of flowing twice the capacity of a 5-inch hose. In the refinery industry, multiple small portable monitor nozzles with 500 gpm or greater flow are the standard when it comes to fire attack on a process unit. Trailer-mounted master stream devices feature multiple large-diameter inlets and can have flows exceeding 6,000 gpm.

The refinery industry also uses quick attack trucks. They are standard pickup or utility trucks equipped with a monitor nozzle and supply line. Typically, these trucks do not have a pump and are fed by a pumper from a remote position or directly from a fire hydrant. These

trucks are disposable; they are driven into a hazard area, the monitor is set up and starts to flow, and the driver exits the area. The idea of a quick attack truck is to gain quick access to control a fire while the overall fire operations plan is developed.

Firefighters must train to challenge their pump operators to supply the needs of the industrial emergency response team. During a recent drill at a facility, a municipal pumper was placed into relay pumping operation. The challenge was to pump a 7¼-inch hoseline longer than 1,000 feet to an industrial pumper. This operation went to unconventional techniques including using a 5-inch to 2½-inch gated wye backwards, essentially taking a traditional gated wye and transforming it into a Siamese--supplying the appliance with two 3-inch hoselines with double females to feed a 5-inch supply line. The operation then took an industrial 7¼"-inch hose line to a 2-- 5-inch gated wye to make a Siamese to allow the pumper to pump a 7¼-inch line. After all the large-diameter and 2½-inch outlets were exhausted, the crew disconnected the deck gun nozzle to supply one more 3-inch hoseline.

Next to the large-diameter discharge, a deck gun outlet is typically one of the largest discharge rates on a municipal pumper. The municipal pump operator was forced to think beyond the typical pumping operation and use all the resources available on the apparatus. This drill was very successful and an excellent teaching tool for maximizing the apparatus. Remember that your pumper's rating is based on drafting; when supplied from a pressurized source, the pump capacity can greatly exceed the pump's listed rated capacity.

Storage Tank Fires

A fire involving storage tanks will involve a complex setup operation to ensure complete tank coverage. This tank coverage may include hoselines on both sides of the tank to achieve complete tank coverage. For example, multiple master streams might be set up on the Alpha side of the tank; the arc of the hose streams will often create a gap in tank coverage on the Alpha side. A line has to be set up on the Delta side to cover this gap. Flows will be greater than 10,000 gpm. In a firefighting foam operation with 3 percent foam, that would be a foam concentrate flow of 3,000 gpm. The flow calculation must include the ability to overcome the overall British thermal units created by the fire. Some of the water will be converted to steam just trying to penetrate the flames. This tank coverage is for applying the fire stream to extinguish the fire and should not be confused with cooling streams. Bulk storage tank firefighting is a complex task and can differ based on roof design, the product in the container, and fixed systems to assist in firefighting.

Placing the Supply Line

Industrial incidents can last hours, if not days. Roadways to apparatus must remain clear to allow the apparatus to be fueled and foam totes to be brought in to support extended foam operations. You must calculate apparatus fuel consumption during extended pumping operations. How long will your pumper last before it needs to be fueled? The last thing you want is to have a pumper run out of fuel. Any disruption during firefighting operations can greatly set back the entire operation.

Ask about how the hydrant loop is fed. What is the typical water pressure on the fire protection water main? Older facilities may maintain a lower pressure on the fire protection loop to reduce the stress on the overall system. Other facilities might have their fire protection water as part of their service water system, which can result in hydrants operating at 200 pounds per square inch or greater. Fire protection water might not be the clean potable water you are used to

from municipal hydrants. Water could be raw water taken directly from the river or lake or recycled water from plant runoff.

Accounting for Your Water

There are three additional things to consider when it comes to water in an industrial facility.

Fire Protection Water. The facility may have a limited amount of fire protection water available. Required fire protection water is often based on the largest fire sprinkler system demand and 500 gpm for handlines for two hours. The problem occurs when multiple sprinkler systems activate, increasing the demand on the dedicated fire protection water.

Another problem can occur when the handline demand is greater than 500 gpm. For example, if the fire department deploys a 1,000-gpm master stream, the dedicated water supply is not going to last for two hours. ICs must work with plant operators to determine the water supply and how long that supply will last. The facility may want the fire department to help develop an alternative water supply plan should the fire protection water be exhausted. In the Philadelphia incident mentioned earlier, firefighters used the fire boat to help supplement the plant's resources.

You must know where hose streams can and cannot be applied. Water-reactive chemicals and solids are some of the obvious considerations, but you should know about these hazards prior to arriving at a fire. In December 2009, a firefighter was killed and eight firefighters were injured in a dumpster fire at a foundry. High-pressure steam lines are found in many industrial facilities. The cold water of a fire stream can result in the catastrophic failure of a high-pressure steam line. In addition to the scalding temperatures of steam, high-pressure steam will also displace the oxygen in the area. In June 2018, in Kansas, two power plant workers were killed as they stepped off an elevator to investigate a steam leak.

Firefighters must account for runoff from hoselines, especially when working at upper levels of the facility. Water runoff can trickle down through the facility and create other problems at lower levels as critical equipment gets wet from the runoff. This problem can result in larger problems, especially as critical equipment begins to trip offline. Firefighters must be aware if the runoff contains oils or other hazardous materials that will need to be collected.

Applying water at industrial incidents involves precision. Place spotters where they can see well enough to guide placement of the master streams for maximum stream application. At times, you will have to apply a precise stream with minimal water. For example, in coal power plants, spontaneous combustion of coal in plant coal storage systems occasionally occurs. Many times, plant personnel can safely mitigate these smoldering incidents. In most power plants, coal travels from the bunkers and silos into the mill, which pulverizes the coal. These mills operate above the upper explosive limit of coal. Any introduction of hot coal in a mill can have catastrophic results. There is a balance of water application in bunker and silo fires. Enough water has to be applied to the coal to extinguish the fire.

On the other hand, overapplication of water to coal silos and bunkers will result in the coal being too wet to burn. In this case, operators have to allow the coal to dry in the silo/bunker. The heat created during this drying process often results in smoldering coal. Do not treat coal bunker and silo fires like a dumpster fire and fill it up until the fire goes out. Consider that rekindles will occur if the plant is unable to unload coal from the bunker/silo.

Emergencies

An emergency at an industrial facility is typically the beginning of a series of cascading events. The initial emergency occurs, and plant operators are divided on whether to safely continue operations or safely shut down the machinery while dealing with the emergency situation. As the fire occurs, additional equipment is often adversely affected. This adverse reaction can result in additional fires or equipment failures. The fire department's operations can also factor into this cascading if fire protection water gets into critical systems. ICs must be ready with ample resources and contingency plans should additional emergencies arise.

Emergency Response Teams

Ask the facility if it has an emergency response team (ERT) on site. If so, try to find out the levels of skills of its members and the types of equipment it has. Unfortunately, some teams exist in name only. Their levels of equipment and training will put your members at risk. On the other hand, some industrial response teams will rival the best fire departments in the country when it comes to equipment and training. Their industrial pumpers will dwarf the size of the largest municipal pumpers.

The make-up of the team and how people join the ERT vary also. Some larger facilities employ full-time personnel whose job is emergency response. These response personnel may be employed by the company or may be contractors. In many cases, ERTs are staffed by facility employees whose primary job is not emergency response. In some cases, being a member is a highly coveted opportunity. In other cases, employees volunteer for or are assigned to the ERT. Often industrial workers are assigned to the ERT as part of their regular job duties.

It is important that you understand the level to which plant personnel are committed prior to your arrival. When it comes to fire response, are they incipient trained--respond in standard work clothes with an extinguisher or a small handline? Incipient employees are not supposed to take evasive to avoid heat, smoke, or toxic gases. Does the facility have an exterior fire brigade? Exterior fire brigades may be equipped with self-contained breathing apparatus (SCBA) and structural PPE. In the case of an outside fire brigade, the members can be in an immediately dangerous to life or health (IDLH) zone but not inside a structure.

Is there an interior structural fire brigade? If so, municipal firefighters may arrive to find industrial firefighters conducting interior operations on their arrival. OSHA requires interior fire brigade members to attend a training or an educational session at least quarterly. Find out if your fire department can participate in one of these training sessions. During an emergency interior fire, brigade members should be paired with a fire company to lead them to the location and identify hazards and resources in the area.

Hazmat, Confined Space

ERTs are typically not limited to firefighting operations. Hazardous materials and confined space emergency response teams are not uncommon in industrial facilities. These teams are found on site based on the sheer number of hazardous materials and confined spaces on site. For example, in addition to process chemicals, the facility might have water treatment, sewage treatment, and/or emissions scrubbing equipment on site. Confined space entries might be a daily activity. Municipal firefighters will find that many industrial facilities' training and equipment exceed those of the local fire department. These responders can be a tremendous asset when it comes to identifying the hazards of a confined space or hazardous materials incident, but outside responders may be needed to supplement personnel needs to complete the operation.

Medical

A plant nurse or paramedic may be on site to handle minor medical emergencies so that employees with job-related emergencies do not have to seek care off site. Furthermore, many facilities have medical ERTs made up of first responders; emergency medical technicians; and, in some cases, paramedics. The equipment may be as simple as a medical jump bag or as advanced as advanced life support. Some facilities even have ambulances on site and may be able to transport off site. Local emergency medical services providers should be aware of the treatment levels and protocols available at an industrial facility to avoid potential conflicts at an emergency scene.

Outside responders should ask to see the emergency response equipment a facility has. The overall quality and care of the equipment can speak volumes about the abilities of a team. Check the equipment for interoperability, especially relative to the SCBAs of an interior fire brigade.

When it comes to personnel and equipment, be careful not to get into company politics. Some facilities struggle to fund an ERT, and it can be very easy for an outside response organization to fall into an internal conflict when it comes to equipment, training, and staffing. Many in the fire service are far too familiar with the struggles when it comes to determining the wants and the needs of equipment, training, and staffing within our own organizations.

Security

Security at large industrial facilities is typically very tight. Security guards can range from an unarmed guard to heavily armed personnel. You must know which facility gates to use to enter the building. Once on site, how will you access an area? It's obvious that in a non-hazardous emergency plant, personnel most likely will escort firefighters to the area of the emergency. In a fire incident, how will firefighters access all areas of the facility? Magnetic locks requiring employees to use ID badges to access are common in secured facilities. During an emergency, can security provide an all-access ID? Identify barriers to response before an incident occurs.

Plant Evacuation and Accountability

Determine what the evacuation and accountability practices are if the facility needs to be evacuated. Where do the personnel go? Is there a plan to account for all employees? A common practice in industry is taken from the playbook of school evacuations: Employees are assigned to work groups. These groups report to a designated area of the facility for accountability. A single employee, typically a supervisor, is responsible to ensure that all members are present. That supervisor then reports the status of his/her work group to a designate individual, who reports the overall accountability to plant management and outside responders. This is a very efficient system for primary accountability, but there is still a slight risk that a small percentage of employees may be overlooked and unaccounted for.

Secondary accountability must be performed based on the gate activity logs that should account for personnel on site. Determine how many personnel are on site or in a specific work area during the day, the night, and on weekends and holidays. Determine how many contractors will be on site during a maintenance turnaround or an outage. Facilities periodically conduct major preventative maintenance projects, and the census of the facility can exponentially grow during these projects.

Personal Protection

Always be aware of your surroundings in an industrial facility. You can find yourself in a bad place when it comes to moving and self-starting equipment. The noise level and general temperature of the facility are typically greater than what you are used to. Communications are more difficult. Crews will need to be rotated more often because of the stress of the ambient heat of the facility coupled with the heat of the fire. Crews need to be very aware of their surroundings and the hazards that exist. If you do not know about the hazards, ask. Crews must also be aware of their location within the facility and the locations of the nearest exits.

Combustible Dust

The fire service does not have many written materials on the danger of dust. Dust is explosive and is a common byproduct in many manufacturing processes. Despite the best housekeeping efforts, it is an ever present risk. Take steps to minimize the risk of stirring up dust with hoselines. Interior crews should use wide fog lines initially to suppress and wash down the dust. Once dust suppression has been completed, you can narrow down the hoselines and attack the fire.

Electrical Hazards

There is a huge demand for power in industry. It is not uncommon to find both alternating and direct current power within a facility. Facilities might have a small power plant on site. You will often encounter dry and oil-filled transformers, large breaker buses, battery banks, and emergency generators, to just name a few hazards. Critical systems within a facility are often backed up through one or two redundant systems. Older facilities may have wiring that contains asbestos. Be aware that low voltage in industry means anything under 600 volts. To put this in perspective, the orange high-voltage wiring in a hybrid vehicle is 480 volts.

Hazardous Substances

The amount of substances used in an industrial process can be an eye-opening experience. Facilities may have water-treatment or sewage-treatment facilities on site. Hydrogen is used as a cooling gas.

Regulatory Agencies

In large-scale incidents, regulatory agencies may arrive to begin to gather information on the incident. Are there injuries or fatalities that might require an Occupational Safety and Health Administration investigation? Is there an environmental release that may require the Department of Natural Resources or the Environmental Protection Agency to investigate? The IC may need to appoint a liaison officer to assist these agencies in gathering the information they are seeking.

For many of us in the fire service, a large industrial incident will be a once-in-a-career event and, if we are not careful, a career-ending event. The size and complexity of these incidents will challenge local responders. The key to building an efficient operation is to develop and maintain a relationship with the key stakeholders long before the incident occurs. The key to successfully mitigating industrial emergencies is integrated preparedness.

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This article originally appeared in Fire Engineering's Industrial Supplement January 2020.

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