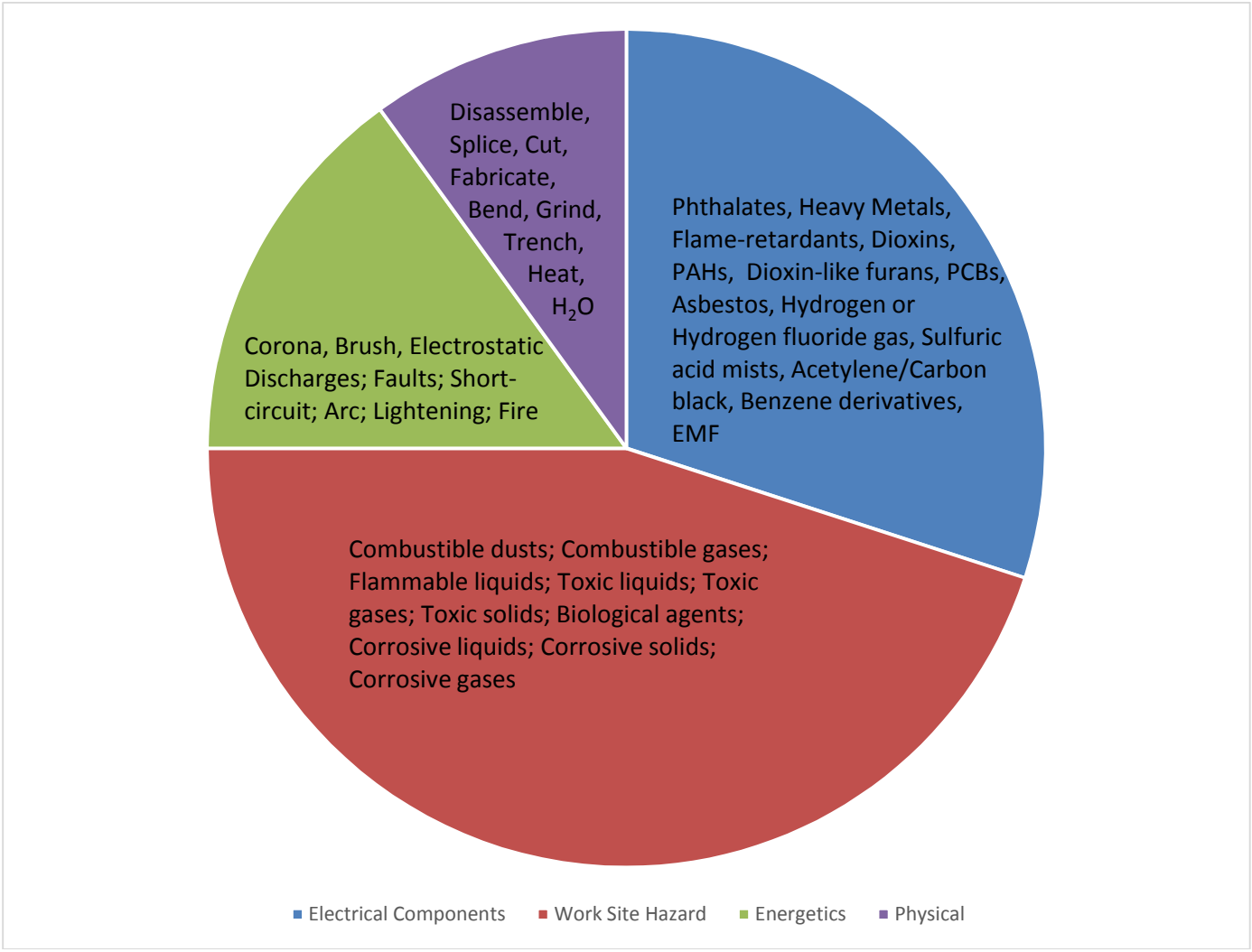
Risk Assessment for Electrical Contractor

Opportunities for environmental releases of pollutants are not obvious when looking at the electrical equipment and components of the trade. Hazards are largely posed by exposure to electricity. However, those same hazards also create environmental exposures under certain conditions.

Two pieces have to come together: 1) a material that contains or can become hazardous, and 2) a mechanism for its release. In each category, there are two options: 1) the materials are either what you work with, or what is present at the work site; and 2) the mechanism is either energetic or physical. Some of the pollutants leach out of electrical equipment/components over time with the help of heat, oxidation, or moisture, while others are formed by events such as fire or flow of current. These events can occur at the fixed location of business where supplies/equipment are stored and stocked. However, the more serious exposures occur at the work site where existing hazardous substances are present. This is particularly true for Class I, Divisions 1 and 2, and Zones 0 - 2 locations because additional contained hazardous materials may be released after the initial explosion or fire, and equipment damage.



Potential Exposures:

Heavy Metals

Though older versions of electrical equipment/components will contain more of these, many heavy metals are still used today. These can be found in solders, circuit boards, interconnects, batteries, conduit, servers, lighting applications, solar panel photovoltaic modules, diodes in control panel screens, etc. Metals include lead, copper, silver, mercury, zinc, tin, antimony, molybdenum, and cadmium. Impacts range from developmental and cognitive impairment to liver and kidney damage. They are also noted for impacts on aquatic ecosystems.

Flame-retardants (FR) and Plasticizers

Most plastics and polymer coatings in electrical equipment/components contain FR chemicals which provide a higher threshold to flashpoint temperatures and limit the spread of fire. Many FRs are brominated, *e.g.*, polybrominated biphenyls (PBBs). Flexible cording contains plasticizers, such as phthalates. These compounds easily leach from the polymer matrix, and because of their environmental persistence accumulate in the surrounding materials, soil, water, and biota. Pyrolysis (fire, high temperature) of FRs results in brominated dibenzofurans and dioxins released to air, while lower temperature fire and melting produces corrosive and toxic HBr gas. These chemicals are endocrine disruptors, carcinogens, and cause developmental/reproductive toxicity.

Asbestos

Older motors and cables utilized asbestos-based fabrics for insulation and protection from fire. Installations and upgrades at facilities built prior to the early 1980's may result in disturbance of asbestos contained in building materials, insulation, mastic, and gaskets. Health impacts include respiratory illnesses and lung cancer when inhaled.

Dioxins and Dioxin-like Furans

Many of the plastic resins found in electrical equipment/components are based on chlorinated polymers. Under conditions of fire, dioxins and dioxin-like furans are released into air and can be inhaled. Settling of these compounds with/without precipitation events results in distribution into the environment. Health effects range from cancer to reproductive toxicity.

Fluids and Lubricants

Various synthetic or petroleum oils, greases, or waxes with additives are used as insulting media, dielectric fluids, quenching media, lubrication, and heat transmission. They are found in receiver tubes of commercial concentrated solar parabolic power systems, circuit breakers, transformers, telecom cables, power transmission cables, condensers, capacitors and other electrical devices. Mixing of incompatible lubricants may result in leakage and equipment damage. Stock supplies may leak/spill. Fault and lightning strikes may cause vaporization of fluids, explosions, and containment ruptures. These compounds are flammable, and some are carcinogens.

Work-site Conditions

Temporary conditions for power supply amid other work conducted at construction sites may result in insulation breaks, short-circuits, and exposed conduit, or discontinuous ground-fault protection. Arcing or ohmic overheating may occur as a result of electrical maintenance, repair, normal operation, or when bringing new equipment online. This may occur in the presence of an ignitable gas or flammable liquid. Alternatively, it may cause a failure in downstream equipment that is responsible for containing these hazardous substances. Damages to human health, property, and the environment are directly correlated to the type of hazardous substance present.

Claims Examples:

Claims Example 1 – While installing new overhead electrical lines, a utility contractor had a subcontractor sinking the new utility poles. The subcontractor hit an underground sewer line with an auger while installing the new poles. Cleanup of spilled sewage and repair of the sewer line amounted to $190,000.

Claims Example 2 – An electrical contractor disposed of project material at a municipal landfill approximately ten years earlier. The contractor was notified by the EPA that he was considered a de minimus potentially responsible party (PRP) and his settlement portion was $180,000. Coverage was denied under his general liability coverage. Story and outcome

Claims Example 3 – Electrical Contractor – Asbestos. While installing new electrical lines in a historic building, the contractor used a hole saw to cut through a ceiling. Unknown to the contractor, the saw inadvertently disturbed and released asbestos-containing insulation material. The contractor had to pay cleanup costs for the asbestos fibers released throughout the building.

Hazard Prevention Tip:

Most PCB-containing electrical equipment (transformers, capacitors, ballasts, circuit breakers, reclosers, voltage regulators, switches) have been taken out of service due to age and failure. Because continued uses were terminated as of July 1979, the likelihood of encountering PCBs is not as great today. However, new oils added to equipment without draining and clean out of the old, may still contain some levels of PCBs. Be safe and use a field test kit or swipe test to determine if PCBs are present.