



CHARACTERIZATION OF COLLEGES & UNIVERSITIES

Colleges and universities have a broad impact on the environment. Since they serve a population of students, faculty, and staff they need to maintain and grow their own facilities. They are typically responsible for providing classrooms, offices, research space, laboratories, administrative offices, housing, transportation facilities from parking to buses to bike racks and bikes, as well as space for retail operations like book stores, printing shops, and restaurants. The institution as a developer has a large impact on the way land is used both on and off campus.

Colleges and universities operate many types of facilities, each of which brings its own types of environmental risks. These facilities and operations include:

- Laboratory facilities, which may provide outside testing services.
- Bus and motor vehicle fleets and associated maintenance shops, with Underground Storage Tanks (USTs) for backup generators or vehicles.
- Landscaping, building maintenance, pest control services, road maintenance, and engineering facilities
- Agricultural facilities, farms, and ranches
- Swimming pools and associated chemical supplies
- Water and wastewater treatment plants
- Athletic centers, gymnasiums, equestrian centers, marine facilities and sports arenas
- Hospitals and infirmaries, with patients with impaired immune systems, and regular use of radioactive material which requires special handling and disposal.
- Day care centers, which often impose a more stringent standard of allowable contamination.
- Institutional kitchens and dining rooms, with food storage and refrigeration systems
- Newspaper and printing centers
- Radio and television stations
- Art galleries and museums
- Airports and aircraft

In addition to the risk management needs to address environmental risks, the US Environmental Protection Agency has over the past decade pursued an Audit Initiative to encourage colleges and universities to voluntarily discover, disclose, and correct violations of environmental requirements. The EPA noted violations in the areas of hazardous waste management, spill prevention, and storm water protection. Some air and toxic substance control issues were documented as well. These violations resulted in enforcement actions with penalties ranging from \$300K to over \$1.0 million.

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POTENTIAL ENVIRONMENTAL RISKS AND EXPOSURES ENCOUNTERED BY COLLEGES & UNIVERSITIES

Schools have many of the same operations, albeit on a smaller scale, as an industrial or manufacturing facility. Many operations require storage, handling and disposal of potentially hazardous materials and chemicals. Frequently, departments operate separately with permanent and seasonal staff, which makes it difficult to consistently monitor compliance with environmental regulations. Often, hazardous waste volume magnifies those difficulties. Some campuses produce tons of hazardous waste monthly.

The following are typical environmental risks associated with colleges & universities:

- Contamination associated with dead/live cellular material (bone fragments, viruses)
- Biological and infectious waste (bandages, needle tips, specimen containers, blood bags)
- Exposures to laser smoke which contains toxic gases (benzene, hydrogen cyanide, formaldehyde, bio-aerosols)
- Exposures from gases such as oxygen, chlorine and ethylene oxide at any one of many potential sites (maintenance, laboratory, cafeteria, art studio, etc).
- Exposures from the improper handling and use of hazardous materials in academic departments, classrooms and laboratories.
- Releases from chemical storage areas and waste collection sites
- Contamination of soil, groundwater and surface water due to releases from aboveground and underground storage tanks (ASTs and USTs)
- Soil, groundwater and surface water contamination from routine application and storage of pesticides and fertilizers.
- Liabilities associated with exposure to asbestos and/or lead.
- Liabilities associated with poor or deteriorating indoor air quality.
- Liabilities associated with exposure to mold, fungus and other microbacteria.
- Exposures from Radon emissions and accumulation, especially in subsurface, poorly ventilated offices and storerooms.
- Release of contaminants during the transportation of hazardous waste to disposal sites
- Discharge of untreated or improperly treated wastewater to municipal wastewater treatment plants.
- Historical soil and groundwater contamination that is undocumented or misrepresented
- Liabilities arising from gifted property that may contain unknown or undisclosed contamination.

THE FOLLOWING CHEMICALS, WASTES AND HAZARDOUS MATERIALS ARE OFTEN ASSOCIATED WITH COLLEGES & UNIVERSITIES:

- Bio-hazardous wastes and laboratory reagents
- Radioactive ionizing and non-ionizing materials and radon
- Fluid laboratory chemical packs
- Gasoline, diesel fuel, heating oil
- Housekeeping/maintenance chemicals and paint waste
- Food ingredients & products

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- Fertilizers, herbicides, pesticides
- Asbestos, lead, mercury
- Chemicals that ensure sterility
- Cutting oils, hydraulic fluids
- Disinfectants and antiseptics
- Medicines
- Chlorinated and non-chlorinated solvents