



ACRP WebResource 21: Environmental Stewardship and Compliance Training for Airport Employees

**Hazardous Materials and Waste
Management Training Course**

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PROGRAM

Course Objectives and Overview

This course will provide a high-level overview of hazardous materials, waste management and the related regulations that apply to airports.

In this course, you will learn:

- The importance of handling hazardous materials safely at airports
- Regulations that apply to hazardous materials and waste management in the airport environment
- Permits and plans that pertain to hazardous materials and waste management
- Typical sources of hazardous materials and waste at airports

Links to federal references may be modified over time. Please search FAA and other federal websites to find the most current reference material.

Key Definitions and Terms

- **Aqueous Film Forming Foam (AFFF)** – firefighting foam used worldwide, known for its effectiveness in fighting aircraft fires; contains per- and polyfluoroalkyl substances (PFAS)
- **Best Management Practices (BMPs)** – schedules of activities, maintenance procedures, and management practices implemented to minimize point source-discharge impacts
- **Clean Water Act (CWA)** – establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters
- **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** – a law created to provide federal authority to respond to releases of hazardous substances which may be harmful to public health or the environment
- **Hazardous Air Pollutants (HAPs)** – toxic gases known to have impacts on human health
- **Hazardous Materials** - any commercially transported substances or materials that pose unreasonable risk to public health, safety, and property. They include hazardous wastes and hazardous substances, as well as petroleum and natural gas substances and materials.

Source: EPA. n.d. Home page. <https://www.epa.gov/>

Key Definitions and Terms (cont'd)

- **Hazardous Substances** – hazardous waste, hazardous air pollutants, substances designated as hazardous pursuant to the Clean Water Act and the Toxic Substances Control Act, as well as elements, compounds, mixtures, solutions, or substances listed in 40 CFR Part 302 that pose substantial harm to human health or environmental resources
- **Hazardous Wastes** – solid wastes that are ignitable, corrosive, reactive, or toxic (sometimes called “characteristic wastes”)
- **Per- and Polyfluoroalkyl Substances (PFAS)** – a group of manufactured chemicals that have been used in industry and consumer products since the 1940s; also called “forever chemicals” because they do not break down easily
- **Perfluorooctane Sulfonic Acid (PFOS)** – a member of the PFAS chemical group, designated by the EPA as a drinking water contaminant that causes some negative health effects
- **Perfluorooctanoic Acid (PFOA)** – a member of the PFAS chemical group, designated by the EPA as a drinking water contaminant that causes some negative health effects
- **Point Source** – “a fixed location or facility that discharges pollution—for example, a factory smokestack, a ship, an ore pit, a ditch, or a pipe discharging treated industrial wastewater or treated sewage into a waterway”
- **Pollutant** – any type of industrial, municipal, or agricultural waste discharged into water

Source: EPA. n.d. Home page. <https://www.epa.gov>

Key Definitions and Terms (cont'd)

- **Pollution Prevention** – describes methods used to avoid, prevent, or reduce pollutant discharges or emissions through strategies such as using fewer toxic inputs, redesigning products, altering manufacturing and maintenance processes, and conserving energy (EPA n.d.)
- **Resource Conservation and Recovery Act (RCRA)** – a federal statute that establishes guidelines for hazardous waste and non-hazardous solid waste management activities in the United States (EPA n.d.)
- **Solid Waste** – any discarded material that meets specific regulatory requirements, including refuse and scrap metal, spent materials, chemical byproducts, and sludge from industrial and municipal wastewater and water treatment plants (EPA n.d.)
- **Spill Prevention, Control, and Countermeasure (SPCC)** – a CWA regulation which requires facilities to develop a prevention, control, and countermeasure plan for spills to prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil (EPA n.d.)
- **Stormwater Pollution Prevention Plan (SWPPP)** – a plan that outlines how stormwater runoff, erosion, and sediment will be controlled to minimize polluted stormwater runoff into waters (EPA n.d.)
- **Waste** – any type of “unwanted or unused” products, materials, or substances that happens to be produced or arrive at the airport site and needs to be given proper treatment (ICAO n.d.-b)

Why is Waste Management Important?

Waste management is the process of handling waste as well as managing the requirements of the various types of waste (ICAO. n.d.-a).

- The generation and disposal of waste, coupled with the demand to manufacture new items to replace those that have been discarded, have the potential to affect air quality, water quality, and other environmental resources (Turner 2018)
- Planning and implementing programs for waste reduction, reuse, donation, recycling, composting, and energy generation are important aspects of waste management (Turner 2018)
- The release of hazardous materials can impact water, air, and other environmental resources (EPA 2024)



Waste at Airports

In general, waste from airports can be divided into eight types of waste:

1. **Municipal solid waste (MSW)** – everyday items that are used and then discarded, such as product packaging, furniture, clothing, bottles, food scraps, and newspapers
2. **Construction and demolition (C&D) waste**– any non-hazardous solid waste from land clearing, excavation, or the construction, demolition, renovation or repair of structures, roads, and utilities. C&D waste commonly includes concrete, wood, metals, drywall, carpet, plastic, pipe, land clearing debris, cardboard, and salvaged building components.
3. **Green waste** – tree, shrub, and grass clippings; leaves; weeds; small branches; seeds; pods; and similar debris generated by landscape maintenance activities
4. **Food waste** – food that is not consumed or is the waste generated and discarded during food preparation activities

Source: FAA. 2013. *Recycling, Reuse and Waste Reduction at Airports: A Synthesis Document*.
<https://www.faa.gov/sites/faa.gov/files/airports/resources/publications/reports/RecyclingSynthesis2013.pdf>

Waste at Airports (cont'd)

- 5. Waste from aircraft flights (deplaned waste)** – materials include bottles and cans, newspaper and mixed paper, plastic cups and service ware, food waste, food-soiled paper, and paper towels
- 6. Lavatory waste** – lavatory tanks of the airplanes are emptied via hose and pumped into a lavatory service vehicle
- 7. Spill cleanup and remediation waste** – materials from cleanup of spills or the remediation of contamination from various types of sites on an airport (e.g., storage tanks, oil and gas production, vehicular leaks, and spills from maintenance activities)
- 8. Hazardous waste** - solid wastes that are ignitable, corrosive, reactive, or toxic, including universal wastes

Source: FAA. 2013. *Recycling, Reuse and Waste Reduction at Airports: A Synthesis Document*.
<https://www.faa.gov/sites/faa.gov/files/airports/resources/publications/reports/RecyclingSynthesis2013.pdf>

Waste Management Regulations

The following regulation applies to waste management at airports:

- The FAA Modernization and Reform Act of 2012 expanded the definition of airport planning to include “developing a plan for recycling and minimizing the generation of airport solid waste.”
- All airports that have a master plan, or plan to prepare one, and receive Airport Improvement Program (AIP) funding for an eligible project must ensure that the new or updated master plan addresses issues related to solid waste recycling at the airport

For guidance on airport recycling, reuse, and waste reduction, see [FAA Guidance on Airport Recycling, Reuse, and Waste Reduction](#).

Airports can prepare a recycling, reuse, and waste reduction plan as an element of a master plan or master plan update, within a sustainability planning document, or as a standalone document.

Source: FAA. 2022. Airport Recycling, Reuse, and Waste Reduction. https://www.faa.gov/airports/environmental/airport_recycling

Waste Management Permits

State and local agencies are often responsible for and have the most knowledge about solid waste issues at an airport. Airports should consult with state and local agencies for:

- Information on how solid waste may cause impacts and how to handle the waste to minimize impacts
- Any permits required for off-airport disposal of C&D waste and other non-municipal solid waste
- Information on how to handle and dispose of solid waste in an environmentally safe manner



Text Source: FAA. 2023, October. 1050.1 Desk Reference (v3).
https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref

Waste Management and Pollution Prevention

Airports can improve waste management and therefore prevent environmental pollution through implementing recycling, reuse, and waste reduction plans, which can include the following:

- Implement single-stream and multi-stream recycling programs
- Reuse construction waste, such as pavement millings
- Implement a composting program for green waste
- Implement procedures to ensure hazardous waste and universal waste are stored or disposed of according to federal, state, and local regulations



Why is the Safe Handling of Hazardous Materials Important?

The release of hazardous materials can impact water, air, and other environmental resources.

- Federal, state, and local laws regulate hazardous materials use, storage, transport, and disposal, as well as accidental spills
- Airport sponsors that are purchasing or developing lands for airport purposes may encounter hazardous materials
- Disturbing sites containing hazardous materials or contaminants may cause impacts to soil, surface water, groundwater, air quality, and the organisms using these resources
- Sites with hazardous contaminants require proper disposal or management of materials during construction, which increases the cost of development

Airport development as well as operations may result in the release of hazardous materials.

Source: FAA. 2023, October. 1050.1 Desk Reference (v3).
https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref

Hazardous Materials at Airports

These products, commonly found at airports, often contain hazardous materials:

- Any fuels, oils or grease, or other maintenance/cleaning fluids
- Pesticides, insecticides, or herbicides
- Solvents
- Paints
- Battery acids
- Deicing/anti-icing fluids
- Firefighting chemicals
- Others may be present

When selecting products, airports should choose non-hazardous material substitutes whenever possible.

Source: Denver International Airport. n.d. Storage, Environmental Guidelines, Handling, and Management of Hazardous Materials. <https://www.flydenver.com/business-and-community/sustainability/ems/>

Environmental Concerns from Hazardous Materials at Airports

Improper and unsafe handling of hazardous materials can result in:

- Fuel or chemical spills reaching the stormwater or sanitary system
- Hazardous air pollutants impacting indoor and outdoor air quality
- Contamination of soils, surface waters, groundwater, and drinking water



Text Source: Denver International Airport. n.d. Storage, Environmental Guidelines, Handling, and Management of Hazardous Materials. <https://www.flydenver.com/business-and-community/sustainability/ems/>

Causes of Hazardous Materials Contamination at Airports

Common causes of contamination from hazardous materials include:

- Improper storage of hazardous materials
- Lack of spill response plan and materials
- Improper or inappropriate disposal of hazardous materials or their derived wastes
- Improper disposal of contaminated spill response media
- Aged infrastructure resulting in fuel system pipe breaks

Airport operators should understand if the wastes they generate are hazardous or non-hazardous.

Airports are required to complete an environmental site assessment or report prior to acquisition of land to determine the presence of existing contaminants if using federal funds or requesting federal reimbursement, per FAA Order 1050.1.

Source: Denver International Airport. n.d. Storage, Environmental Guidelines, Handling, and Management of Hazardous Materials. <https://www.flydenver.com/business-and-community/sustainability/ems/>

Regulation of Hazardous Materials Containment at Airports

The following are the most commonly regulated containments at airports:

- Aboveground storage tanks (AST)
- Underground storage tanks (UST)
- Fuel farms
- Drums
- Emergency generators
- Mobile refuelers
- Towable equipment (including snow melters)
- Oil-filled operational equipment (e.g., transformers, elevator reservoirs, and hydraulic lifts)

Conduct regular inspections of hazardous materials storage areas that are not frequently attended to help identify potential drips, leaks, and spills.

Source: Mericas, D., J. Longworth, and K. Shannon. 2016. *ACRP Research Report 169: Clean Water Act Requirements for Airports*. <https://doi.org/10.17226/24657>

Comprehensive Environmental Response, Compensation, and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is the federal regulation for the release of hazardous substances. Oversight of CERCLA is conducted by the EPA. CERCLA does the following:

- Defines hazardous substances
- Requires notifying the public about hazardous substance releases that exceed reportable quantities
- Establishes criteria for recovery, cleanup, and response plans
- Defines individual and joint liabilities of potentially responsible parties
- Requires federal agencies to comply with CERCLA at federally owned facilities

Source: EPA. n.d. Home page. <https://www.epa.gov/>

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) is the federal regulation for hazardous waste and non-hazardous solid waste management activities. The oversight of RCRA is conducted by the EPA. RCRA does the following:

- Defines hazardous wastes
- Establishes procedures that hazardous material manufacturers must follow regarding the production, use, and disposal of hazardous material (the “cradle to grave” provisions)
- Regulates the generation, storage, treatment, and disposal of waste

Source: EPA. n.d. Home page. <https://www.epa.gov/>

Airports as Hazardous Material Waste Generators

Generators of hazardous waste fall into one of three classes depending on the amount of hazardous waste generated in a calendar month, as regulated by the EPA.

- Very Small Quantity Generator (VSQG) – no more than 220 lbs. of hazardous waste per month
- Small Quantity Generator (SQG) – between 220 lbs. and 2,200 lbs. of hazardous waste per month
- Large Quantity Generator (LQG) – more than 2,200 lbs. of hazardous waste per month

Volumes of hazardous waste generated from airport operations typically classifies airports in the VSQG or SQG categories.

For more information from the EPA about generator sizes and the regulations that apply, visit [Categories of Hazardous Waste Generators](#).

Source: EPA. n.d. Home page. <https://www.epa.gov/>

Hazardous Waste Permits

The EPA requires SQGs and LQGs to obtain an RCRA hazardous waste generator identification number from the EPA or state.

- The identification number enables the EPA to identify hazardous waste generators by site
- VSQGs are not required to get an EPA identification number
- Hazardous waste permitting differs by EPA region, state, Tribe and local areas
- An RCRA permit is not needed for businesses that generate hazardous waste and then store it for short periods of time before transporting the waste off-site

For more information from the EPA on hazardous waste permits, visit the EPA's [What a Hazardous Waste Permit Is](#)

Specific information on hazardous materials permitting for each state can be found online at the EPA's [Hazardous Waste Permitting in Your State](#).

Source: EPA. 2023. NPDES Permit Basics. <https://www.epa.gov/npdes/npdes-permit-basics>

NPDES Industrial Stormwater Permit

The National Pollutant Discharge Elimination System (NPDES) permit enables pollutant discharges from point sources into waters of the U.S. The permit contains limits on what you can discharge, monitoring and reporting requirements, and other provisions to ensure that the discharge does not hurt water quality or people's health.

- An NPDES permit is required if discharging into waters of the U.S. and may apply to the following airport activities:
 - Equipment cleaning and maintenance, which includes vehicle and equipment repairs, painting, fueling, and lubrication
 - Deicing/anti-icing operations



Text Source: EPA. 2023. NPDES Permit Basics.
<https://www.epa.gov/npdes/npdes-permit-basics>

Spill Prevention, Control, and Countermeasure

The Spill Prevention, Control, and Countermeasure (SPCC) plan describes equipment, workforce, procedures, and training to prevent, control, and provide adequate countermeasures to a discharge of oil.

An SPCC plan is required for:

- Facilities that store greater than 1,320 gallons of oil
- Facilities with completely buried oil storage capacity greater than 42,000 gallons
- Tanks and containers with individual oil storage capacity of 55 gallons or greater (typically drums and totes)
- Facilities that have a “reasonable expectation of an oil discharge” to water
- Non-transportation-related storage of oil, including gasoline, at airports

The SPCC plan is required by federal law and is a standalone plan, separate from NPDES.

Source: Mericas, D., J. Longworth, and K. Shannon. 2016. *ACRP Research Report 169: Clean Water Act Requirements for Airports*. Transportation Research Board, Washington, DC. <https://doi.org/10.17226/24657>

Stormwater Pollution Prevention Plan

The stormwater pollution prevention plan (SWPPP) outlines how stormwater runoff, erosion, and sediment will be controlled to minimize polluted stormwater runoff into waters.

- Required as part of an NPDES permit (for both operations and construction)
- Identifies stormwater Best Management Practices (BMPs) to reduce the potential for industrial pollutants to mix with stormwater
- May require periodic updates to account for stormwater changes and new projects

Project-specific SPCCs and SWPPPs can be required, in addition to overall airport plans.

Source: Mericas, D., J. Longworth, and K. Shannon. 2016. *ACRP Research Report 169: Clean Water Act Requirements for Airports*. Transportation Research Board, Washington, DC. <https://doi.org/10.17226/24657>

Deicing and Anti-icing Guidelines

Deicing aircraft and airfield pavement is critical to ensuring safe flight operations during winter weather; however, runoff from deicing and anti-icing applications can have adverse environmental impacts.

- The EPA has established rules for discharges associated with aircraft and pavement deicing
- Without discharge controls in place, deicing operations can degrade nearby water bodies
- Airports are required to obtain stormwater discharge permits under the NPDES program and ensure that wastes from deicing operations are properly collected and treated

For more information from the EPA on effluent deicing guidelines, visit [Airport Deicing Effluent Guidelines](#).



Airport Fuel Farms

A fuel farm is an area designated for bulk fuel storage and associated equipment. Fuel farm facilities are found at most airports throughout the U.S.

- Part 139 certified airports must meet the standards specified in National Fire Protection Association (NFPA) 407, Standard for Aircraft Fuel Servicing
- FAA Advisory Circular (AC) 150/5230-4, Aircraft Fuel Storage, Handling, Training, and Dispensing on Airports provides guidance on managing a fuel farm
- Non-Part 139 certified airports are not required to develop fuel standards; however, the FAA recommends these airports use the guidance in AC 150/5230-4 to enhance safety
- Fuel is considered a hazardous waste and is regulated under federal and local regulations

Per- and Polyfluoroalkyl Substances

Per- and polyfluoroalkyl substances (PFAS) are synthetic chemicals with unique properties, including both water and oil repellency and surfactant properties.

- Nicknamed "forever chemicals" because they do not break down easily
- PFAS are used in aqueous film forming foam (AFFF), which is used to extinguish class B flammable liquid fires at a variety of facilities, including commercial airports
- If an airport has never stored, transported, or used AFFF, the airport is unlikely to have a concern associated with AFFF or PFAS
- The regulation of PFAS is evolving; additional information can be found at [Per- and Polyfluoroalkyl Substances \(PFAS\) | US EPA](#).

Source: Thalheimer, A.H. et al. 2017. *ACRP Research Report 173: Use and Potential Impacts of AFFF Containing PFASs at Airports*. Transportation Research Board, Washington, DC. <https://doi.org/10.17226/24800>

Sources of PFAS at Airports

Potential sources of PFAS at airports include:

- Firefighting training areas where AFFF is used
- Firefighting equipment maintenance areas (e.g., from foam tests)
- Disposal areas
- Treatment lagoons
- Impacted soils
- Fire suppression systems in hangars
- Drainage and wastewater systems used to contain discharged fire-extinguishing materials
- Storage areas for AFFF
- Tanks, vehicles, equipment, and distribution systems used to store or apply AFFF that were not adequately rinsed and may have become a continuous source

Regulations pertaining to PFAS are evolving; be aware of changes in regulations if the potential for PFAS exists at your airport.

Source: Thalheimer, A.H. et al. 2017. *ACRP Research Report 173: Use and Potential Impacts of AFFF Containing PFASs at Airports*. Transportation Research Board, Washington, DC. <https://doi.org/10.17226/24800>

FAA Publications on Hazardous Materials

The FAA has published documents to identify and characterize airport projects that are likely to involve the use of hazardous materials and other regulated substances:

- [FAA Order 1050.10D](#), Environmental Pollution Control and Abatement at FAA Facilities
- [FAA AC 150/5320-15A](#), Management of Airport Industrial Waste
- [FAA Order 1050.19C](#), Environmental Due Diligence in the Conduct of FAA Real Property Transactions
- [FAA AC 150/5100-17](#), Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects

What Does this Mean to Your Airport?

Does your airport have a recycling, reuse, and waste reduction plan?

- Provide the plan for review

How does your airport ensure that water quality is maintained?

- Does your airport have a NPDES permit?
- Does your airport have a current SPCC plan and SWPPP?
- Understand how long these permits/plans are valid and when they should be updated

What hazardous materials are stored at your airport?

- Provide hazardous materials list and locations

What areas of your airport are at risk for hazardous materials accidents?

- Provide maps showing locations of hazardous materials sources at the airport, such as tank sites, maintenance hangars, and deicing pads

Is your airport at risk for PFAS contaminations?

- Review historic use of AFFF at the airport, and map the locations of use

Course Wrap-Up

Some key takeaways include:

- Airports can divert waste from landfills and potentially save money by implementing a recycling, reuse, and waste reduction plan
- Implementing waste management plans at airports can reduce impacts to air quality, water quality, and other environmental resources and therefore reduce impacts to human health
- Hazardous materials used, stored, and disposed of by the airport need to be done in a safe manner, in accordance with regulations, to prevent environmental impacts
- An emergency plan (e.g., SPCC plan) must be in place to contain accidental release of hazardous materials
- Airports need to understand their sources of hazardous materials, waste and substances, as well as their potential for contaminating environmental resources

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