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Standard Guide for Management of Investigation-Derived Waste Associated with PFAS[1]

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1. Scope

1.1 Existing guidance on the management of *investigation-derived waste* is focused upon cuttings, purge water, personal protective equipment, and other miscellaneous solid waste generated at property that may be impacted by the release of hazardous materials and hazardous substances. These hazardous substances include, but are not limited to, heavy metals, petroleum, petroleum byproducts, solvents, polycyclic aromatic hydrocarbons, organic and inorganic corrosives, radioactive material, and explosives. Guidance on the management of *investigation derived waste* generated at sites that may be impacted by releases of perfluoroalkyl and polyfluoroalkyl substances (*PFAS*) is limited. This standard guide addresses this deficiency

1.2 This guide describes best practices for managing *investigation-derived waste* associated with *PFAS* that are consistent with federal and state policies and regulations at the date of issuance. The user is advised to determine if new regulations or rules have been promulgated by the state, federal, or tribal regulatory agency having jurisdiction over the property.

1.3 This guide describes considerations to prevent the unintended and unauthorized disposal of liquid *investigation-derived waste* that may contain *PFAS* into wastewater treatment plants or systems that are not permitted to receive these waste streams.

1.4 This guide describes considerations to prevent the unintended and unauthorized disposal of solid *investigation-derived waste* that may contain *PFAS* into landfills or other solid waste disposal facilities that are not permitted to receive these waste streams.

1.5 This guide describes several stormwater pollution prevention best management practices applicable to *investigation-derived waste*.

1.6 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D5088 Practice for Decontamination of Field Equipment Used at Waste Sites

E3302 Guide for PFAS Analytical Methods Selection

2.2 *Other Standards:*

49 CFR 172 Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plans[3]

49 CFR 262 Standards Applicable to Generators of Hazardous Waste[3]

Method 537 : Determination of Selected Perfluorinated Alkyl Acids in Drinking Water[4]

3. Terminology

3.1 *Definitions:*

3.1.1 *investigation-derived wastes, n*—discarded materials resulting from field activities such as sampling, surveying, drilling, excavation, and decontamination processes that, in present form, possess no inherent value or additional usefulness without treatment.

[1] This test method is under the jurisdiction of ASTM Committee E50 on Environmental Assessment, Risk Management and Corrective Action and is the direct responsibility of Subcommittee E50.04 on Corrective Action.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[4] Available from United States Environmental Protection Agency (EPA), William Jefferson Clinton Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, http://www.epa.gov.

3.1.1.1 *Discussion*—Well development and well purge waters are considered *investigation-derived waste*. Soil cuttings, excess sample spoils, and excavated soil that are returned to the borehole or excavation are not considered *investigation-derived waste*. The user must determine if the regulatory authority having jurisdiction over the site, the responsible party, and property owner, permit the return of soil cuttings and spoils to the borehole or excavation. Soil cuttings, excess sample spoils, and excavated soil that cannot be returned to the borehole or excavation are considered *investigation-derived wastes*.

3.1.2 *other regulated wastes, n*—personal protective equipment, (for example, nitrile gloves, paper towels, polyethylene sheeting) and decontamination fluids that may be classified as hazardous or nonhazardous wastes.

3.1.3 *PFAS, n*—perfluoroalkyl and polyfluoroalkyl substances are a group of man-made chemicals consisting of polymeric chains of carbon bonded to fluorine atoms, usually with a polar functional group at the head.

3.1.4 *PFAS-impacted waste, n*—discarded material that contains perfluoroalkyl and polyfluoroalkyl substances and their breakdown constituents.

3.2 *Acronyms:*

3.2.1 *CFR*—Code of Federal Regulations

3.2.2 *DOT*—U.S. Department of Transportation

3.2.3 *EPA*—U.S. Environmental Protection Agency

3.2.4 *IDW*—Investigation-derived waste

3.2.5 *OSHA*—U.S. Occupational Safety and Health Administration

3.2.6 *PFAS*—perfluoroalkyl and polyfluoroalkyl substances and their breakdown constituents.

3.2.7 *PFOS/PFOA*—Perfluorooctane Sulfonate (PFOS) / Perfluorooctanoic Acid (PFOA)

4. Significance and Use

4.1 Perfluoroalkyl and polyfluoroalkyl substances (*PFAS*) are a family of more than 4700 synthetic organic chemicals. *PFAS* can withstand high temperatures and survive highly corrosive environments. They are used in the manufacture of coatings, surface treatments, and specialty chemicals in cookware, carpets, food packaging, clothing, cosmetics, and other common consumer products. *PFAS* also have many industrial applications and are an active ingredient in certain types of fire-fighting foams (aqueous film-forming foams, or AFFF). *PFAS* coatings resist oil, grease, and water. *PFAS* are persistent compounds. Therefore, *PFAS* should be considered for purposes of managing *investigation-derived waste* where *PFAS* is known or suspected to be present in environmental media.

4.1.1 *PFAS* are emerging contaminants for which environmental regulations and guidance are dynamic and are being developed simultaneously at federal, state, local, and international levels as more is learned about their characteristics, environmental fate, and management/treatment. Therefore, site-specific rules, regulations, and guidance should be evaluated for options and restrictions on management of *PFAS investigation-derived waste*. For example, the Massachusetts Department of Environmental Protection has determined that *PFAS* wastes are "hazardous materials" subject to the Massachusetts Oil and Hazardous Material Release Prevention and Response Act (*M.G.L. Chapter 21E*) and the Massachusetts Contingency Plan. Other states and jurisdictions may have or will develop and implement similar determinations that affect the on-site management, storage, and labeling and off-site transportation requirements for *PFAS investigation-derived waste*.

4.1.2 Given the characteristics and persistence of *PFAS* compounds, *PFAS investigation-derived waste* presents special handling and treatment/disposal considerations. EPA recently issued Interim Guidance on the Destruction and Disposal of Perfluoralkyl and Polyfluoralkyl Substances and Materials Containing Perfluoralkyl and Polyfluoralkyl Substances (2020) (**1**)[5]. This interim guidance focuses on technologies for treatment and disposal that have the potential to destroy *PFAS* by breaking the carbon-fluorine bonds or controlling migration of *PFAS* in the environment (for example, secure landfilling). Although the interim guidance focuses on the destruction and disposal of residuals and wastes/waste byproducts from manufacturing activities, the guidance should be considered when evaluating treatment or disposal options for *PFAS investigation-derived waste*.

NOTE 1—The Department of Defense issued a new policy in July 2023 addressing the management of PFAS-contaminated material, including IDW (**2**).

4.1.3 *PFAS investigation-derived waste* may also contain other nonhazardous or hazardous substances or materials that may impact the options and requirements for management. The associated substances should be considered for proper characterization of the *investigation-derived waste* and in selecting containerization, labeling, handling, transportation, and disposal options. (**3**)

4.2 Field investigation activities result in the generation of waste materials that may include *PFAS*. *Investigation-derived waste* may include monitoring well development water, purge water, soil cuttings from boreholes, sediments, soil or fill from excavation activities, solutions from decontaminating sampling equipment, personal protective equipment, and other sampling wastes (for example, paper towels, plastic sheeting).

4.2.1 Soil cuttings, excess sample spoils, and excavated soil that are returned to the borehole/excavation may not be considered *investigation-derived waste* on sites in jurisdictions where regulations and guidance allow for this management option.

4.2.1.1 The user must determine the disposal options for these materials in conjunction with the property owner, responsible party, and the regulatory agency.

4.3 The primary objectives for managing *investigation-derived waste* during field activities include:

4.3.1 Leaving the site in no worse condition than existed before field activities,

[5] The boldface numbers in parentheses refer to a list of references at the end of this standard.

4.3.2 Removing wastes that pose an immediate threat to human health or the environment,

4.3.3 Segregating wastes above background or threshold concentrations,

4.3.4 Complying with federal, state, local, regulations,

4.3.5 Minimizing the quantity of *investigation-derived waste*, and

4.3.6 Properly containerizing, managing, and disposing of *investigation-derived waste*.

4.4 *Container Labeling:*

4.4.1 In accordance with the OSHA Hazard Communication Standard (**4**) or other applicable jurisdictional requirements, an "*investigation-derived waste* container" or "Waste Awaiting Designation" label shall be applied to each drum, intermediate bulk container, portable tank, or other container using indelible marking. Labeling or marking requirements for *investigation derived waste* are as detailed below and should be referenced in the site's Health and Safety Plan and Sampling and Analysis Plan.

4.4.1.1 Include the following information on labels and markings: project name, generation date, location of waste origin, container identification number, sample number (if applicable), and contents (that is, decontamination water).

4.4.1.2 Apply each label or marking to the upper one-third of the container at least twice, on opposite sides.

4.4.1.3 Position labels or markings on a smooth part of the container. The label must not be affixed across container bungs, seams, ridges, or dents.

4.4.1.4 Use weather-resistive material for labels and markings and permanent markers or paint pens capable of enduring the expected weather conditions. If markings are used, the color must be easily distinguishable from the container color.

4.4.1.5 Secure labels in a manner to ensure that they remain affixed to the container.

4.4.2 Labeling or marking requirements for containers of *investigation-derived waste* that is determined to be hazardous material and is expected to be transported offsite must be in accordance with the requirements of U.S. Department of Transportation (DOT) hazardous material regulations (see 49 CFR 172). Wastes determined to be hazardous waste or subject to state, provincial, or tribal regulation will be staged onsite in accordance with the requirements of U.S. EPA hazardous waste regulations (40 CFR 262) or other applicable jurisdictional requirements regarding labeling and marking until disposal options are determined by the property owner, responsible party, or the site operator.

4.5 Investigation-derived waste Container Movement Predetermine staging areas for *investigation-derived waste* containers in accordance with the site's Health and Safety Plan and Sampling and Analysis Plan. Determine the methods and personnel required to safely transport *investigation-derived waste* containers to the staging area before field mobilization. Handling and transport equipment will be consistent with the associated weight for both lifting and transporting. Transportation of *investigation-derived waste* that is considered to be DOT hazardous material offsite via a public roadway is prohibited unless the requirements of 49 CFR 172 or applicable national regulations are met.

4.6 Investigation-derived waste Container Storage

4.6.1 Stage containerized *investigation-derived waste* awaiting results of chemical analysis at a pre-determined location on the site.

4.6.2 Store containers such that the labels can be easily read.

4.6.3 Provide a secondary/spill container for liquid *investigation-derived waste* storage (for example, drums and intermediate bulk containers shall not be stored in direct contact with the ground). In addition, liquid *IDW* should be staged in secondary containment that conforms to the applicable, federal, provincial, state, or tribal regulations for hazardous waste accumulation areas.

4.6.4 The user must determine if federal, state, local, provincial, or tribal regulations impose additional requirements for the temporary storage of *investigation-derived waste*, including those pertaining to storage requirements and limitations for hazardous materials or hazardous wastes. These requirements may include periodic inspections of the containers and implementation of stormwater pollution prevention Best Management Practices (see 5.6).

5. Additional Considerations

5.1 The characterization, containerization, labeling, management, transportation, and disposal of *PFAS*-impacted *investigation-derived waste* should be addressed in the Sampling and Analysis Plan for the investigation. Consideration should be given to the concentrations of *PFAS* in the *investigation-derived waste* and other substances that may impact the proper disposition of the waste. (see Guide E3302 for analytical methods that may be used to characterize *investigation-derived waste*). Based on the persistence of *PFAS* compounds and current uncertainties in characterization and control of *PFAS* in the environment, selected disposal options should focus on treatment that provides for destruction of *PFAS* or controlling future migration of *PFAS* in the environment (**5**). EPA's Interim Guidance on the Destruction and Disposal of Perfluoralkyl and Polyfluoralkyl Substances and Materials Containing Perfluoralkyl and Polyfluoralkyl Substances provides guidance and information that may be useful in determining and selecting methods for final disposition of *PFAS investigation-derived waste*.

5.2 If the *PFAS*-impacted *investigation-derived waste* is from an active site (for example, a site with ongoing operations), permission should be sought from the operator of the site to place the *PFAS*-impacted personal protective equipment, disposable equipment, and/or paper/cardboard into the site's dumpsters or other bulk waste containers. Only with the permission of the owner and approval of the appropriate regulatory authority may these materials may be placed into dumpsters or other bulk containers designated for non-hazardous waste. Upon approval of the appropriate regulatory authority, these materials may also be taken to a permitted landfill.

5.2.1 Disposal of *PFAS*-impacted *investigation-derived waste* such as drill cuttings, drilling mud, purge or development water, decontamination wash water, etc., should be specified in the approved Sampling and Analysis Plan. It is recommended that solid materials be placed into a unit with an