WASTE SITE EVALUATION PROCEDURES HANDBOOK

The Transportation Project Development Process

pennsylvania
DEPARTMENT OF TRANSPORTATION
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ACRONYMS AND DEFINED TERMS

ACM	Asbestos Containing Material
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
BTEX	Benzene, Toluene, Ethyl benzene, Xylene (Gasoline compounds)
CEE	Categorical Exclusion Evaluation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Index System
CFR	Code of Federal Regulations
DEP	Department of Environmental Protection
DRO	Diesel Range Organics
E & E	Engineering and Environmental
EA	Environmental Assessment
EIS	Environmental Impact Statement
EDD	Environmental Due Diligence
ESA	Environmental Site Assessment
FHWA	Federal Highway Administration
FINDS	Facility Index System
FSP	Field Sampling Plan
GPR	Ground Penetrating Radar
GRO	Gasoline Range Organics
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSCA	Hazardous Sites Cleanup Act
LR&WMP	DEP Land Recycling and Waste Management Program
MoFP	DEP Management of Fill Policy
MS4	Municipal Separate Storm Sewer Systems
NEPA	National Environmental Policy Act
NESHAP	National Emission Standard for Hazardous Air Pollutants
NIST	National Institute of Standards and Technology (NIST),
NOB	Non-friable Organically Bound
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List

NVLAP	National Voluntary Laboratory Accreditation Program
OSHA	Occupational Safety and Health Administration
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
PennDOT	Pennsylvania Department of Transportation
PLM	Polarize Light Microscopy
PS&E	Plans, Specification and Estimate
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-Way
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Act: A Legacy for Users
SARA	Superfund Amendments and Reauthorization Act
SEMP	Strategic Environmental Management Program
SIA	Special Industrial Area
SWMA	Solid Waste Management Act
TEA-21	Transportation Equity Act for the 21st Century
TCE	Trichloroethylene (ESA process), or
	Temporary Construction Easement (Construction)
TCLP	Toxicity Characteristic Leaching Procedure
TPDP	Transportation Project Development Process
TPH	Total Petroleum Hydrocarbons
TSD	Treatment, Storage and Disposal
UECA	Uniform Environmental Covenants Act
US EPA	United States Environmental Protection Agency (also, EPA)
US DOT	United States Department of Transportation
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WIP	Waste Investigation Plan
WMP	Waste Management Plan
WQMP	Pennsylvania Department of Environmental Protection Water Quality Management Program

SECTION 1- INTRODUCTION

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Publication 281 provides guidance to PennDOT staff and consultants for the identification and investigation of environmentally regulated waste sites which could have the potential to impact worker health & safety, environmental compliance, cost and schedule of transportation construction projects. The guidance is also applicable to the acquisition of new property and the divestiture of existing facility property, when performed in accordance with administrative procedures in the Facilities Manual (Publication 284). Fill management guidance in this publication is also important for maintenance operations.

Specifically, the publication offers guidance on the following:

1) Evaluation of actual or potential releases of regulated environmental substances within a transportation project

2) Assessment of the regulated environmental substance impact to construction and definition of the associated environmental liability

3) Determination of the best mitigation option(s) for solution presentation to PennDOT management

4) Documentation of waste site investigation in maintenance, design, and construction activities, to demonstrate compliance with NEPA procedures, environmental laws and regulations, and PennDOT procedures and policies.

This guidance focuses on using a three-phased approach to conducting waste site investigations, with an increasingly focused scope of investigation in the later phases of study based on the findings of prior phases. This three-phased approach is flexible and can be modified based on the size and scope of the project, and the acceptable level of risk.

The first phase, or Phase I Environmental Site Assessment (ESA) begins with a broad site information-gathering survey. If required, a second phase, the Phase II ESA, supplements the Phase I with nonintrusive investigations or soil sampling using manually powered equipment. Examples of Phase II investigations include a geophysical survey to look for underground storage tanks (USTs), hand auger collection of surface soil samples, groundwater sampling from existing third -party monitoring wells, and collecting water samples from seeps or surface water bodies. The third phase, or Phase III ESA, is an intrusive investigation of soil or groundwater, using powered equipment, to identify and characterize potential releases of regulated substances to soil and groundwater identified in Phase I and II investigations. This succession of more narrowly focused investigations proceeds based on the previous findings of earlier phases or as specific concerns arise, to adequately address the waste-related concern(s) by final transportation design or other project completion.

The principle concerns driving the waste investigation process include:

- ***NEPA Process*** – The National Environmental Policy Act of 1969 (NEPA), the nation's broadest environmental law, provides a framework for environmental planning and decision-making to all Federal agencies and most of the activities they manage, regulate, or fund. In 1992, to further the goals of the Intermodal Surface Transportation Efficiency Act (ISTEA, 1991), Federal and state agencies involved with transportation and its infrastructure signed an agreement to merge the elements of NEPA and Section 404 of the Clean Water Act, and promote streamlining and interagency cooperation in the Transportation Development Process. The Transportation Equity Act for the 21st Century (TEA-21, 1998) streamlined the environmental review process further. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU, 2005) changed the environmental review process further, and introduced new environmental requirements for the Statewide and Metropolitan Planning process. The major impact of SAFETEA-LU, as it relates to Publication 281, is to recommend the environmental review process to begin earlier, by starting the process in the planning phase of transportation project development, in order to promote early and increased coordination, communication, and

collaboration with resource agencies and the public. More recent transportation legislation has improved NEPA process efficiency but has not fundamentally altered NEPA requirements. The Federal Highway Administration (FHWA) provides a concise overview of the NEPA process applied to transportation projects at its website: (https://www.environment.fhwa.dot.gov/nepa/nepa_projDev.aspx)

- ***Health & Safety*** – The Occupational Safety and Health Administration (OSHA) requires that "no employee will suffer material impairment of health or functional capacity even if [exposed] for the period of his working life." Among the regulations is a requirement to assess risks and protection needs in the areas where hazards may exist. This applies to: Department personnel (i.e., geotechnical investigators, inspectors), resource investigators (i.e. archaeologists), contractors, consultants, and the general public.

- ***Regulatory Standards*** – The development of appropriate contract specifications requires characterization of the type and extent of contaminated media and/or waste, followed by the development of management options that comply with regulatory requirements, including the following:

  - The Storage Tank and Spill Prevention Act (Act 32) promulgated August 5, 1989, provides removal and cleanup reporting requirements for regulated storage tanks.

  - The Land Recycling and Environmental Remediation Standards Act (Act 2), adopted July 18, 1995, established numerical remediation standards for soil and groundwater, which Act 32 eventually incorporated into practice for tanks.

  - The Management of Fill Policy (MoFP) published August 7, 2010 defines Clean Fill, Regulated Fill and Historic Fill. This guidance controls the import and export of fill associated with any PennDOT project and promotes waste soil minimization through reuse of minimally impacted soils.

  - Solid waste and transportation regulations require the characterization of wastes and fill to ensure proper containment, transportation, and disposal or reuse.

  - The National Air Emission Standards, 40 CFR 61 Subpart M, under the National Emission Standard for Hazardous Air Pollutants (NESHAP), establishes asbestos inspection and notification regulatory requirements for the demolition and renovation of facilities such as buildings and bridges.

- ***Legal Liability*** – The procedures set forth in this publication may assist PennDOT in establishing defense against liability under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Hazardous Sites Cleanup Act (HSCA). Publication 281 procedures can be used to show that PennDOT exercised due care and took precautions against acts of third parties, but the procedures do not necessarily meet all of the procedural elements of US EPA's All Appropriate Inquiry (AAI) standard (see Section 4.1, ASTM and Publication 281, for more details).

- ***Cost and Appraisal*** – The presence of contamination has an effect on the cost of a project. This cost will usually be reflected in higher construction costs due to the need for waste handling, and/or lower assessed value of a parcel due to the cleanup liability associated with the acquisition. In either case, valid estimates of cleanup requirements and associated costs are required by those who develop project budgets or appraise real estate. Cleanup costs are typically much lower if waste site management requirements are identified during project planning and included in construction contract special provisions.

- ***Project Management*** – Adequate waste characterization will result in fewer project delays during construction due to the discovery of unexpected contamination.

While these principles of waste management sometimes conflict with other Department activities such as engineering or cost considerations, it must be remembered that when compared to other governing principles, all are equally valid. Consequently, **proper coordination with other activities must be combined with appropriate planning, execution, and interpretation of waste investigations to ensure conformity with both governing principles and the execution of transportation projects.**

Publication 281 also addresses Federal and State laws and regulations related to and/or governing the assessment of environmental impacts, waste investigations, and hazardous substances. These regulations include, but are not limited to:

- ❒ Pennsylvania Act 120 and 71 P.S. § 512 (1997)
- ❒ The National Environmental Policy Act (1969)
- ❒ Federal Aviation Administration Orders concerning environmental assessments and Environmental Due Diligence in the conduct of FAA Real Property Transactions
- ❒ Pennsylvania Department of Environmental Protection's (PADEP's) MoFP
- ❒ The Land Recycling and Environmental Remediation Standards Act (Act 2)
- ❒ The Storage Tank and Spill Prevention Act (Act 32)
- ❒ The National Air Emission Standards, 40 CFR 61 Subpart M, under the National Emission Standard for Hazardous Air Pollutants (NESHAP)
- ❒ Pennsylvania Asbestos Occupations Accreditation and Certification Act (Act 194 of 1990)
- ❒ Pennsylvania Lead Certification Act (Act 44 of 1995), and codified in 34 PA Code, Chapter 203 (i.e., Title X, 40 CFR 745.220-.239)

Compliance with these laws and regulations is incorporated into the PennDOT Transportation Project Development Process. There is no intent on the part of PennDOT to give the procedures in this guidance weight or deference. This guidance is for informational purposes only; it is not regulatory.

The Roadway, Maintenance Technical Leadership Division, Strategic Environmental Management Program (Roadway/SEMP) Section is responsible for the procedural updates and modifications described in this document. Questions or comments may be directed to:

Pennsylvania Department of Transportation
Bureau of Maintenance Operations
Maintenance Technical Leadership Division
Roadway/Strategic Environmental Management Programs Section
400 North Street, 6th Floor
Harrisburg, PA 17120-0064
Telephone 717-787-6899

SECTION 2 - APPLICABILITY

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The process and associated procedures promoted in this guidance apply primarily to highway/bridge design projects, although the investigative steps are appropriate for maintenance and construction activities involving waste-related issues, and for property acquisition and divestiture. For construction and maintenance activities of limited scope, however, the use of the entire "phased" site investigation approach may not always be applicable. Use of these procedures is beneficial to the District Maintenance and Construction units in that they provide guidance and an industry-accepted "waste investigation thought process" to investigate suspected or known waste-impacted sites, ensure that adequate health & safety measures are considered, minimize the Department's potential environmental liability, and reduce both design and construction costs. As one example application of an abbreviated site investigation process, appropriate due diligence may be used to characterize a temporary construction easement (TCE) both before and after construction, in order to protect PennDOT from future environmental liability for TCE activities. A waste site assessment is not required for transportation improvement projects that will not involve earth disturbance or property acquisition.

2.1 TRANSPORTATION PROJECT APPLICABILITY

These procedures are established to guide PennDOT's transportation project design staff and consultants in the proper identification and assessment of waste sites within the construction right-of-way (ROW) during the highway design phase Transportation Project Development Process (TPDP). Waste investigation procedures should be fully integrated with other aspects of the TPDP. The waste investigator (Investigator) must work in close collaboration with a project designer (Designer) to assure understanding the transportation project requirements and associated earth disturbance as these come into focus, to adequately identify waste liability relevant to the project.

For example, transportation improvements for road beds, bridge abutments, elevated roadway pier foundations, embankments, utilities, storm water best management practices (BMPs), greenways, traffic signal poles and signage footers may all require significant earth work disturbance with the potential for waste generation. The Investigator must work in coordination with the Designer during Preliminary Design and Final Design to determine the depth and extent of earth disturbance required for each component of the transportation improvement project. The highest probability for waste generation during construction will occur where planned excavation activities may intercept historical waste fill, or soil or groundwater previously contaminated by an environmental release within or near the project area.

Therefore, it is incumbent on the Investigator to assess soil and groundwater quality relative to environmental standards and fill and waste management criteria within the Limit of Disturbance (LOD) of a construction project. Waste site assessment data is then used to evaluate the risk of encountering contaminated soil or groundwater, and develop mitigation options for implementation during Final Design or during construction.

A waste site investigation properly integrated with the project design and properly performed will produce credible findings, that when properly evaluated, best assures: 1) conformity with regulatory requirements, 2) identification of mitigation measures such as avoidance, select fill placement, or worker and public health monitoring, and 3) promotion of fill conservation and waste minimization. Furthermore, time and PennDOT's experience demonstrate that this can be cost-effectively accomplished without compromising project schedule or safety.

Transportation project waste site investigation findings influence the entire project from design on through construction and into post construction stormwater BMP operation and maintenance. Waste site investigation results are not an end in itself, but rather a means to diverse end uses. Some of the outcomes in which waste site investigation data are influential in transportation projects include the following:

- ❒ Right-of-way acquisition
- ❒ Waste soil reuse
- ❒ Stormwater BMP location, construction and operation

- ❒ Open space/greenway planning and protection
- ❒ Utility protection and preferential pathway elimination
- ❒ NPDES Individual Permit erosion and sedimentation controls and post-construction stormwater management measures
- ❒ Contract Waste Special Provisions and Waste Management Plans
- ❒ Department estimates of waste types and volume for Plans, Specifications and Estimates packages
- ❒ Environmental Commitment Mitigation Tracking System
- ❒ Contractor Health and Safety Plan and Site Work Plan
- ❒ Waste transporter and disposal/treatment facility selection
- ❒ Excavation dewatering, treatment and permit requirements
- ❒ Worker and public health monitoring

The application of these procedures is designed, at a minimum, to establish "**appropriate inquiry**" within the project limits. The procedures are to be executed in such a way as to balance the need to minimize delay and maximize cost-effectiveness. Typically, investigations for the Phase I should be initiated early in the preliminary design stage of the project development process. Conversely, Phase III investigations should be deferred until the preferred alternative is selected, and/or final design elements, such as cut and fill areas, are known.

Table 2-1 below summarizes the integration of waste site assessment procedures into the various NEPA environmental documentation/clearance processes, including:

- ❒ Categorical Exclusions (CEs)
- ❒ Environmental Assessments (EAs)
- ❒ Environmental Impact Statements (EIS).

Environmental clearance decision documents that result from the above evaluation processes include CE approvals, Findings of No Significant Impact (FONSI) in the case of an EA, or a Record of Decision (ROD) in the case of an EIS.

The Federal Highway Administration (FHWA) website provides guidance for preparing and processing these environmental and Section 4(f) documents **(FHWA 2006)**. The guidance provides instruction with respect to Hazardous Waste sites governed by the federal acts: Resource Conservation and Recovery (RCRA) Act and Comprehensive Environmental Response, Compensation, and Liability (CERCLA) Act.

Under normal circumstances, waste site assessments should be completed according to the steps identified in the highway development process. However, due to the dynamic nature of the waste site evaluation process, some flexibility may be required to complete studies in an effective and cost efficient manner. Coordination between the Investigator, the District, and the Roadway/SEMP Section staff will help to determine an appropriate time line for completion of studies. Thus, **planning and coordination** are vital.

These procedures will not satisfy and therefore should not be employed for Federal

> **NOTE:** Phase II or Phase III Waste Site Investigations may need to be conducted earlier than usual if other critical activities require invasive studies that utilize Phase II or Phase III results.

(Comprehensive Environmental Response, Compensation, and Liability Act - CERCLA), or State (Hazardous Sites Cleanup Act - HSCA) Superfund sites. Transportation projects that will encroach on waste sites or Solid Waste Management Units (SWMUs) regulated in accordance with these Federal regulations must follow alternate procedures pursuant to the provisions of the specific programs under which the site is listed. Should a Superfund or RCRA Corrective Measures site be involved, Roadway/SEMP Section must be contacted for specific guidance.

Publication 281 meets the substantive requirements of the Environmental Protection Agency's (EPA's) All Appropriate Inquiry (AAI) for the Transportation Development Process, but does not meet all procedural elements of AAI for facility acquisitions. Facility acquisitions and divestitures are to be managed in accordance with Publication 284, the Facilities Manual, which states that Publication 281 are to be followed for waste investigation concerns.

DEP has acknowledged in a letter dated March 6, 2008, that this publication is consistent with PADEP's MoFP.

Table 2-1
Completion of Waste Site Investigations

Environmental Documentation (NEPA/PA Act 120)	Waste Site Investigations		
	Phase I ESA	**Phase II ESA**	**Phase III ESA**
Categorical Exclusion Evaluations (CEEs)/Environmental Documentation (ED)	Completed Concurrently with CEE Preparation	Early in Final Design Activities	Completed by End of Final Design Activities
Environmental Assessments (EAs)/ Environmental Evaluation Reports (EERs)	During Alternatives Development and Impact Analysis	Mitigation and Identification of Preferred Alternatives through Final Design	Mitigation and Identification of Preferred Alternatives through Final Design
Environmental Impact Statements(EISs)/ Environmental Evaluation Reports (EERs)	During Preliminary Alternatives Development and Review	Detailed Alternatives Development and Review through Final Design	Draft EIS Preparation and Circulation through Final Design

(Under normal circumstances, waste site assessments should be completed by the Step shown for each phase. However, due to the dynamic nature of the waste site evaluation process, some flexibility may be required to complete studies in an effective and cost efficient manner. Coordination between the Investigator, the District PM/Environmental Unit, and Roadway/SEMP Section will help to determine an appropriate time line for completion of studies.)

2.2 BROWNFIELD ECONOMIC REDEVELOPMENT

The U.S. Department of Transportation (US DOT) announced on April 22, 1998, that it will encourage the use of Brownfield sites for transportation projects, to the extent practicable. This policy is a reversal from the former policy developed in 1988 that emphasized the avoidance of all contaminated properties as a first consideration during the NEPA process and other related transportation development activities. The Brownfield Economic Redevelopment Initiative provides assistance and incentives to state and local governments, as well as the private sector, for the assessment, cleanup, and economic reuse of contaminated properties known as "Brownfields". Brownfields are abandoned, idled, or under-used commercial, industrial or institutional properties where redevelopment and reuse are complicated by light to moderate contamination from hazardous substances and often times Historic Fill. Many Brownfields qualify for special treatment under Act 2 as Special Industrial Areas (SIAs).

The Transportation Equity Act for the 21st Century (TEA-21) addresses the issue of economic growth partnered with acceptable environmental practices within its consideration for sustainability, thus capturing the essence of the Brownfield Initiative. The FHWA urges state Department of Transportations (DOTs) to encourage further use of Brownfield properties rather than building on Greenfields, as the reuse of Brownfield properties often result in revitalization of urban areas and depressed communities. This policy will also aid in the mitigation of urban sprawl and congestion. ***The use of Brownfield sites should occur when the location is consistent with the purpose and need of the transportation improvement, and when the cleanup and liability costs are reasonable when considering the public benefit of the project.***

Due to potentially complex regulatory and liability issues concerning Brownfield sites, District staff is encouraged to contact Roadway/SEMP Section if the use of Brownfields is planned as part of the highway development process. PennDOT transportation projects have benefited from the use of the Act 2 SIA standard to optimize waste minimization.

2.3 FEDERAL AVIATION ADMINISTRATION STATE BLOCK GRANT PROGRAM

14 CFR Part 156 authorizes the State Block Grant Program whereby the state administers Airport Improvement Program (AIP) grants authorized under the Airport and Airway Improvement Act of 1982, as amended. The Harrisburg Aviation District Office (ADO) and the Commonwealth executed the State Block Grant Program between the FAA, Harrisburg Airports District Office, and the Pennsylvania Department of Transportation on February 7, 2002. This agreement requires that the state shall be responsible for all environmental actions related to the State Block Grant Program, except for 14 CFR Part 150 studies/programs and any Environmental Impact Statements (EIS). The agreement further requires that the environmental actions shall be in accordance with the Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act and with FAA Orders concerning the environmental assessment process and due diligence in real estate transactions. FAA environmental orders and notices may be found by selecting "Environment" under *Browse By Topic at.* **To the extent that Publication 281 conflicts with the guidance of FAA Orders, the FAA Orders shall take precedence for projects funded under the State Block Grant Program.**

SECTION 3 - HEALTH AND SAFETY

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When waste site investigations are to be conducted at sites that potentially contain, or are known to contain waste materials, potential health hazards and general safety hazards must be considered to ensure the safety of all persons entering a site, including PennDOT personnel, contractors, the public, and other affected parties.

Health and safety hazards can range from the conspicuous, such as noxious fumes, drummed chemicals, lagoons, etc., to the less obvious, such as slip/trip/fall hazards, falling objects, etc., to the unperceived, such as biohazards, radiation, explosives and confined spaces. The procedures for identifying or minimizing potential exposure to these hazards are established by the preparation of a Health and Safety Plan (HASP).

The provisions for ensuring private sector worker health and safety, enacted by the Occupational Safety and Health Act of 1970 (29 USC 651 et seq.), are codified under Title 29 Code of Federal Regulations (CFR), and are primarily administered by OSHA **(OSHA, 2018)**. The General Industry Standards at 29 CFR 1910 establish health and safety practices applicable to all types of work. In most cases, these standards reflect typical (industrial/commercial) work place practices, and are derived from industry and other non-governmental sources. However, certain sections are relative to specific job functions or activities, such as hazardous waste operations.

The Hazardous Waste Operations and Emergency Response (HAZWOPER) regulations in 29 CFR 1910.120 contain the guidance for conducting operations at **uncontrolled hazardous waste sites**. These are the applicable operating practices in an area where an accumulation of material (hazardous or otherwise) creates a health and safety threat to individuals and/or the environment. The Occupational Safety and Health Act of 1970 specifically exempt state employees from compliance with these standards. However, the U.S. Environmental Protection Agency (EPA), under the authority of the Superfund Amendments and Reauthorization Act of 1986 (SARA) has codified standards identical to 29 CFR 1910.120 (40 CFR 311) which extend to all parties, including state employees.

29 CFR 1926, Subpart C sets forth additional health and safety requirements specifically for the construction industry. **Table 3-1** lists other OSHA standards that may be applicable to waste site investigation operations. OSHA requires an organization to institute a comprehensive health and safety program under 29 CFR 1910.120 (b). **Table 3-2** outlines the general program requirements.

Table 3-1
Potentially Applicable OSHA Standards Under 29 CFR

1910.20	Access to Employee Records	1910.252	Welding, Cutting, and Brazing
1910.24	Fixed Industrial Stairs	1910.307	Hazardous Locations
1910.27	Fixed Ladders	1910.1000	Air Contaminants
1910.28	Safety Requirements for Scaffolding	1910.1200	Hazard Communication
1910.38	Employee Emergency Plans & Fire Prevention Plans	1926.20	General Safety & Health Provisions
1910.94	Ventilation	1926.21	Safety, Training, and Education
1910.95	Occupational Noise Exposure	1926.56	Illumination
1910.101	Compressed Gasses	1926.1101	Asbestos
1910.133	Eye and Face Protection	1926.59	Hazard Communication
1910.134	Respiratory Protection	1926.151	Fire Prevention
1910.135	Head Protection	1926.152	Flammable and Combustible Liquids
1910.136	Foot Protection	1926.200	Accident Prevention Signs and Tags
1910.141	Sanitation	1926.301	Hand Tools
1910.151	Medical Services and First Aid	1926.400	Electrical General Requirements
1910.157	Portable Fire Extinguisher	1926.401	Grounding for Protection of Employees
1910.165	Employee Alarm Systems	1926.651	Specific Excavation Requirements
1910.181	Derricks	1926.652	Requirements for Protective Systems
1910.212	General Machine Requirements		

Adapted from *Standard Operating Safety Guidelines*, US EPA, Publication 9285.1-03 (June 1992).

Table 3-2
Health & Safety Program
Comprehensive and Site-Specific Components

Comprehensive Health & Safety Program	Site-Specific Health & Safety Plan
The HAZWOPER regulations at 29 CFR § 1910.120 (b)(1) require a comprehensive health and safety program that includes: ➢ Organizational structure ➢ Site-specific work plans ➢ Site-specific HASPs ➢ Training program ➢ Medical surveillance program ➢ Standard operating procedures ➢ Coordination procedures	*The HASP implements certain components of the health and safety program on a site-specific basis. The HASP includes:* ➢ Key personnel ➢ Health and safety risk analysis ➢ Site control measures ➢ Training assignments ➢ Medical surveillance requirements ➢ Personal protective equipment ➢ Air and employee monitoring ➢ Spill containment program ➢ Confined space procedures ➢ Decontamination procedures ➢ Emergency response plan

Adapted from Standard Operating Safety Guidelines, US EPA, Publication 9285.1-03 (June 1992).

3.1 APPLICABILITY

The purpose of this section is to provide an overview of the fundamentals of the health and safety considerations relative to a waste site investigation. Waste site investigations covered by these procedures are performed for the expressed purpose of ascertaining the type, extent, and impact (if any) of substances which pose health, safety, or environmental concern(s) relative to the TPDP.

In general, the probability that a worker will encounter or be exposed to a significant quantity of a hazardous substance on a job site is relatively low; however, until a given site has been characterized for hazardous substances, the danger (if any) posed by the conditions at the site remains unknown. Consequently, **the health and safety of workers must be the definitive factor governing waste site field investigations.** A site which is uncharacterized is also unpredictable, and thus potentially dangerous. Nevertheless, by applying a phased investigative approach, adequately equipped and trained personnel can utilize standard operating procedures to acceptably limit the potential for harm from environmentally regulated substances.

3.2 GENERAL GUIDANCE

It must always be clearly understood that **the employer is solely responsible and legally liable for ensuring the health and safety of their workers.** If PennDOT employees conduct an investigation, then PennDOT is responsible. If consultant employees conduct an investigation, the consulting firm is responsible. Consequently, the party responsible for conducting the investigation must be allowed to make the final assessment as to what are acceptable (safe) work conditions and practices.

NOTE: PennDOT acknowledges receipt of the consultant's HASP, but does not provide comment.

In the absence of adequate site characterization, OSHA requires the Investigator to assume worst-case site conditions, and thus, to proceed in a highly conservative manner. Indeed, health and safety considerations are so fundamental, that by law an employee who is genuinely uncomfortable with the site conditions cannot be compelled to enter the site, even if a valid HASP is in place.

3.3 PHASE I HEALTH AND SAFETY

A PennDOT Phase I ESA is primarily a desk top study, with a field view strictly noninvasive in nature. Data gathering in the field is typically accomplished through visual observations only. It is expected that the Investigator is able to recognize common hazards, and should avoid contact with suspect materials.

Due to the unlikely potential for chemical exposure above permissible exposure limits (PELs) a HASP is not specifically required by 29 CFR 1910.120. However, the use of a generic HASP, or at a minimum, a health and safety checklist is strongly recommended. Due to the limited invasive nature of a Phase I, Personal Protective Equipment (PPE) should not exceed Level D as described in 29 CFR 1910.120, Appendix B.

NOTE: While a site-specific HASP or checklist may be required, PennDOT considers preparation to be incidental to the development of the Phase I or Phase II ESA.

3.4 PHASE II HEALTH AND SAFETY

The Phase II is intended to gather additional site specific data to complete the information gaps identified in the Phase I. Field activities are generally limited to sampling of suspect surface soils, surfaces, surface liquids (usually water), or groundwater from existing wells. Additional fieldwork may include noninvasive geophysical investigations for buried waste source determination and/or asbestos building inspections.

Those conducting the field investigation must be aware of the potential, but generally limited, hazards that may be involved and possess experience necessary to respond to these hazards. Those conducting asbestos inspections must be certified as Asbestos Building Inspectors by the Pennsylvania Department of Labor and Industry in accordance with the Pennsylvania Asbestos Occupations Accreditation and Certification Act (Act 194 of 1990). Though not within the scope of Act 194, PennDOT also requires this certification for outdoor asbestos inspections, e.g. for bridges.

Additionally, personnel conducting lead sampling may be compelled to comply with certification requirements in accordance with the Pennsylvania Lead Certification Act (Act 44 of 1995), and codified in 34 PA Code, Chapter 203 (i.e., Title X, 40 CFR 745.220-.239).

Generally, due to the limited exposure hazard, PPE requirements for a Phase II should not exceed Level C as described in 29 CFR 1910.120, Appendix B. In rare instances, there may be the need for increased personal protection. A site-specific HASP or checklist is required for a Phase II by 29 CFR 1910.120.

NOTE: While a site-specific HASP or checklist is required, the Department considers said preparation to be incidental to the development of the Phase I or Phase II.

3.5 PHASE III HEALTH AND SAFETY

Site conditions encountered during a Phase III can range from an uncharacterized hazardous waste site to a partially characterized nonhazardous site. Real hazards can vary from extreme to none. However, since a Phase I and/or Phase II will have previously been completed, an assessment of the site hazards is usually completed prior to the Phase III work.

Personnel conducting field studies should be experienced, and should, at a minimum, be trained and medically certified in accordance with 29 CFR 1910.120 (e) (3) (ii and iii) (i.e., HAZWOPER 24-hour training).

PPE requirements for a Phase III may range from Level D to Level A, as described in 29 CFR 1910.120, Appendix B. PPE requirements are dependent on the known or suspected site conditions and the planned activities.

A site-specific HASP may be required for an uncontrolled hazardous waste site in a Phase III in accordance with 29 CFR 1910.120. Additionally, before invasive activities begin, the Investigator must locate any underground utilities through the Pennsylvania One Call system (1-800-242-1776) in accordance with the Pennsylvania Underground Utility Protection Law (Act 172 of 1986). Before the commencement of invasive activities, it is also the responsibility of the Investigator to locate underground utilities, USTs, pipes, and other buried structures in the interior of a suspect waste site properties i.e. that beyond the scope of PA One Call.

The preparation of a Phase III HASP is usually considered as a separate billable task in the scope of work. Typically, the preparation of a Phase III HASP should not exceed more than five percent (5%) of the total cost of the investigation.

NOTE: NOTE: HASP development in the scope of work is typically NOT incidental to a Phase III.

SECTION 4 - GENERAL WASTE INVESTIGATION GUIDANCE

SECTION 4 - GENERAL WASTE INVESTIGATION GUIDANCE

The PennDOT waste site investigation process employs a phased evaluation approach, consisting of three flexible phases termed Phase I, Phase II and Phase III, to identify actual or potential waste areas/sites that have the potential to adversely impact the construction project. Generally, the Phase I consists of background research on the historical and current use of the property to identify potential areas of environmentally regulated substance release(s), termed Areas of Concern (AOC). A property within the transportation project, whether privately owned and subject to a partial take, or as entirely acquired by PennDOT, which contains one or more actual or potential AOCs is typically termed a waste site of concern.

The Phase II uses information obtained in the Phase I to implement more detailed site-specific research which may include geophysical or other surface/shallow materials sampling. The Phase III is a detailed intrusive investigation designed to identify the type(s) and magnitude of regulated substance releases for transportation project risk assessment and mitigation planning.

The focus of waste site investigations, relative to PennDOT's TPDP, is to identify, early in the process, all real estate properties that contain released regulated substances or AOCs which could be an environmental liability and affect project construction. At a minimum, this requires the determination of whether properties within the potential highway construction zone are known or are suspected to currently or previously have generated, used, stored, or released regulated substances into the environment, as well as how the released substance(s) may affect construction planning. During construction, these waste materials may pose a serious human health threat, or may be released into the natural environment causing natural resource damage. Post-construction requirements can also be substantial, such as stormwater management, and can be assessed as part of PennDOT's phased evaluation process.

Section 4.0 includes guidance on the following:

- ❒ ASTM due diligence practices and the PennDOT waste site investigation process
- ❒ Common waste sites of concern on transportation projects
- ❒ Waste site investigation scope of work development
- ❒ Waste site investigation phasing hierarchy and decision making
- ❒ PennDOT and transportation project stakeholder responsibilities

4.1 ASTM AND PUBLICATION 281

The ASTM has developed several standards of practice to perform environmental site assessments for commercial property transactions. These include:

- ❒ ASTM E1527 – 13: *Standard Practice for Environmental Assessments: Phase I Environmental Site Assessment Process*
- ❒ ASTM E1528 – 14: *Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process*
- ❒ ASTM E1903 – 11: *Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process.*

The primary purpose of the ASTM standards is to provide consultants and consumers with a process for conforming with EPA's All Appropriate Inquiry (AAI) due diligence standard to support an Innocent Landowner Defense against environmental liability. More information on the Innocent Landowner Defense may be found on US EPA's website, using the keyword search term "Innocent Landowner."

Despite the shared objectives of the ASTM Phase I and Transaction Screen to PennDOT's waste site investigation process, PennDOT has not adopted the ASTM standards, procedures, or terminology. Accordingly, PennDOT's Phase I, II, and III waste site investigations are intended to meet the requirements of this Publication rather than the aforementioned ASTM standards. On the rare occasion when the District

project manager wishes to obtain the benefits of AAI conformance, an enhancement of the environmental site assessment procedures will be required to meet the ASTM standards.

Although PennDOT's waste investigation process is similar to these ASTM methods, there are some fundamental differences. These include:

- ❒ Three phases of investigation rather than two
- ❒ No title search for individual properties within the PSA/ROW
- ❒ Specific assessment of risk and mitigation options to the transportation project

PennDOT identifies three phases of investigation to afford greater flexibility to best match the variability in scale and complexity of transportation projects from roadway maintenance and single span bridges to commercial roadway/intersection improvements on up to new highway system and community bypass projects miles in length. The waste evaluation process can end at any one of the three phases if resultant information adequately defines actual or suspect waste AOCs and applicable mitigation measures. PennDOT advocates, per FHWA and the NEPA process, completing the Phase I as early as practical in the transportation design process to assure early identification of all relevant waste issues. The Phase III is typically completed during final design, when the transportation project is near finally focused and future potential earth disturbance for transportation features and storm water management BMPs is understood. The Phase II can flex between these phases, as required, helping to complete the waste site investigation process with the Phase I, for no further action or no further action at that time, or can be an immediate precursor to a Phase III to better focus identification and location of intrusive tasks.

Property title searches are a common component of an ASTM Phase I scope of work, but are seldom requested by PennDOT District Project Managers or Environmental Managers. Transportation projects can involve dozens to hundreds of private and public properties. Title searches, if required, should focus on waste sites for which deed restrictions or deed notices may have been recorded. Title searches are best managed by PennDOT District ROW units. Titles alone rarely provide significant information concerning past site use, beyond a possible business name and dates of operation. Better information on past site use can be gained from Sanborn Maps, aerial photographs, environmental record database searches and interviews.

Essential to a PennDOT waste site investigation is the evaluation of findings to interpret and express: 1) relative risk to the transportation project, roadway maintenance effort, or property acquisition/divestment, and 2) appropriate mitigation options. Identification of known or suspect waste sites, and AOC's within each waste site is not the end objective. Rather, waste site investigation data is used to assess potential waste site impacts upon the transportation project. This is the single most important component of the waste site investigation process and the highest value service the Investigator provides to other project stakeholders, in particular the project Designer/Manager.

4.2 COMMON WASTE CONCERNS

Investigator familiarity with the types of private and commercial businesses, manufacturing enterprises and agricultural practices that have a recognized history of regulated substance releases to soil and groundwater underpins a thorough waste site investigation. Waste can originate historically, or contemporarily from a wide variety of situations, the more common of which include, but are not limited to the following:

- ❒ Commercial, industrial and agricultural practices
- ❒ Storage tanks and Act 32 cleanups
- ❒ Act 2 Land Recycling Program cleanups.

Elements of each essential to competent waste site evaluation are reviewed in the following sections.

4.2.1 COMMERCIAL, INDUSTRIAL AND AGRICULTURAL PRACTICES

Certain types of commercial, industrial and agricultural properties and practices provided in the list below comprise the majority of waste sites encountered during the transportation development process. The list provides the most common wastes and chemical pollutants associated with each suspect waste site type.

Suspect Waste Site Types	Potential Waste/Chemical Product Problems
Gas/Service Stations	Petroleum products (USTs), Lead, Acids
Dry Cleaners	Chlorinated and Petroleum solvents (storage tanks and as releases)
Waste Lagoons	Heavy metals (e.g. Pb, Cr, Cd, As), PCBs, solvents
Residential Housing, or other Buildings scheduled for demolition	Asbestos, Heating oil (storage tanks)
Salvage Properties	PHC, Heavy metals, Acid, PCBs
Battery reclamation sites	Lead, Cadmium, Zinc, Acidic groundwater
Transformer sites	PCBs
Railroad maintenance sites	Lead, PAHs, PCBs
Foundries	Heavy metals, PAHs (waste used as fill)
Orchards	Heavy metals (esp. As, Hg, Pb, Cu), Pesticides
Metal finishing/painting sites	Heavy metals, Solvents
Historic Fill, per Mgmt. of Fill Policy *	Regulated Fill status if used offsite
Metal truss bridges	Heavy metals (esp. Pb, Cr, Cd, Zn) in paint, soils
Manufactured gas plants	Coal tar, Total Cyanide

* *Examples of Historic Fill: pre-1988 fill containing wood and coal ash, incinerator ash, cinders, or foundry slag. See guidance in Section 4.7, Due Diligence with Fill, and definition of Historic Fill in Section 7.0, Glossary.*

Though the Investigator should look for these suspect waste site types during waste site investigations, the Phase I ESA, in particular, should consider assessment results for all properties of concern in the project area to ensure that the appropriate level of inquiry is accomplished for the project.

4.2.2 STORAGE TANKS

The most common regulated substance impacts to soils and water in transportation projects result from leaking storage tanks, primarily pre-Act 32 USTs, due to their proliferation, unavailability of records, poorly regulated operation and closure, and the lack of leak prevention/detection equipment and construction standards. Remediation costs for UST removals are typically one percent or less of highway construction costs, but individual UST removals may cost five percent of a particular highway improvement project if groundwater remediation is required.

In 1988, the US Environmental Protection Agency began regulating the installation, maintenance, removal, and corrective action procedures for USTs. In 1989, Pennsylvania complied with the Federal storage tank regulations through the promulgation of the Pennsylvania Storage Tank and Spill Prevention Act (Act 32 or "Storage Tank Act"). Those USTs still in operation by 1989, or newly installed beginning in 1989 had to register with the PADEP and were deemed regulated, with few exclusions or exceptions. Tanks that ceased operations prior to 1989, including those left in place, became unregulated tanks. USTs left in place and unregistered are commonly referred to as abandoned or orphaned tanks when no prior content storage and use history is available.

The Storage Tank Act defined above ground versus underground tanks. A storage tank is considered a UST if at least 10% of the tank is located below the surface of the ground. However, a below-grade storage tank is considered an Aboveground Storage Tank (AST) if fully accessible from the exterior and resting on a floor, such as the bottom of a vault. The full definition of Underground Storage Tank may be found in 25 Pa. Code § 245.1. Additional storage tank guidance may also be found in Publication 694, the Storage Tank Management Manual.

Regulated USTs typically encountered in the Transportation Development Process are commercial motor fuel, kerosene, or waste oil tanks, plus associated underground piping. Abandoned USTs containing more than one inch of liquid product are also regulated USTs. A "regulated UST" is the standard term for a UST regulated under Act 32. However, some USTs are in fact regulated under the Resource Conservation and Recovery Act (RCRA) and/or the SWMA, not Act 32, for which different removal and corrective action

requirements apply, as appropriate. For example, an empty steel heating oil UST with no releases to soil may simply be recycled as scrap metal in accordance with the SWMA, but if it is found to have released contamination into soil, then the Land Recycling and Environmental Remediation Standards Act (Act 2) cleanup requirements must be met in order to meet obligations under the Solid Waste Management Act and Clean Streams Law.

Unregulated USTs include any size UST that was abandoned/orphaned or otherwise never registered with PADEP prior to 1989, provided that it currently does not contain more than one inch of product. Tanks identified as unregulated under Act 32 also include:

- ❒ USTs with a capacity of 110 gallons or less
- ❒ septic tanks
- ❒ USTs containing heating oil for onsite consumption
- ❒ USTs regulated by the Solid Waste Management Act (SWMA)
- ❒ stormwater or wastewater systems
- ❒ spill/overflow system USTs
- ❒ farm/residential motor fuel USTs of 1,100 gallons or less capacity.

DEP's Program Guidance No. 4.4.1: "Out-of-Service UST Systems and Closure" clarifies the PADEP position on how the Federal regulation is applied to abandoned or Pre-Act tank closures. **The Federal Storage Tank regulations (40 CFR Part 280) exempt UST closures conducted prior to December 1988, as long as they were properly closed (abandoned) under any existing regulations in force at the time.** State Police regulations found in 37 Pa. Code Chapters 11, 13, and 14, implementing the act of April 27, 1927 (P. L. 450, No. 291) (35 P. S. § § 1181—1194), colloquially referred to as the "Fire Marshal's Law", gave the Pennsylvania State Police the authority to permit UST installations and closures. Proper closure under the Fire Marshal's Law and State Police regulations required that all regulated substances be removed from the tank and the tank be filled with an "inert" (e.g. water, concrete, sand) substance. Unregulated tanks closed prior to the tank act that have not impacted soils and groundwater do not require a remedial action by PennDOT or its Contractors.

Petroleum contaminated media and debris is classified as a Residual Waste, by exemption from the EPA definition of hazardous waste by 40 CFR §261.4(b)(10), which PADEP regulations incorporate by reference at 25 Pa. Code §261a.1. In most instances, if these soils or water are excavated or pumped during construction, they will be classified as Residual Waste, requiring transport by licensed haulers to permitted treatment/disposal facilities. Therefore, all sites with USTs, having contained only virgin fuel (e.g. gas, diesel, kerosene, fuel oil, etc.) or waste/used oil, are regulated as Residual Waste sites. Waste/used oil that contains 1,000 mg/kg (ppm) of total halogens is classified as a Hazardous Waste, unless chemical analysis allows the rebuttal conditions of 25 PA Code §298.10 to be met.

In addition to historical environmental contamination associated with unregulated/orphaned tanks, regulated active tanks that otherwise prove sound through the various approved integrity demonstration criteria and methods could have experienced spills at: 1) tank fill ports without spill and overfill protection, 2) dispensers that were not equipped with spill buckets, or 3) piping runs, especially at joints or elbows, due to progressive differential settlement. An Investigator must also understand that environmental contamination associated with tanks closed in accordance with Act 32 Corrective Action Procedures (CAP) may still exist after the cleanup, and that a closure approved by PADEP could still present waste issues/expenses if encountered and excavated during construction. Act 32 corrective actions rely on Act 2 standards, which combined with attainment demonstration practices, can still leave impacted soils and water on a site or within a smaller AOC within a site, waiting for site reuse and a roadway project. The next section describes situations in which contamination can remain behind following an approved cleanup.

Lastly, a corollary program associated with Act 32 is the Underground Storage Tank Indemnity Fund or USTIF, established to provide participating tanks owners a means to pay for the cleanup of environmental contamination associated with leaking USTs. Although PennDOT does not participate in the USTIF program,

if PennDOT acquires a site or tank system undergoing a cleanup wholly or partially funded by an approved USTIF claim, PennDOT may be eligible for continued coverage of the cleanup by USTIF, provided that the USTIF claimant transfers ownership of the claim to PennDOT prior to PennDOT taking ownership of the property. PennDOT may also be eligible for USTIF reimbursement for costs associated with the disposal of soil or groundwater contaminated by a neighboring UST site with an existing USTIF claim; however, USTIF claim details are confidential. If excavation deeper than 3 feet is planned near an active or former regulated UST Corrective Action site, the District or Roadway/SEMP Section can follow up with the Pennsylvania Insurance Department to find out if a USTIF claim has been approved for the 3rd-party UST Corrective Action.

4.2.3 ACT 2 LAND RECYCLING PROGRAM CLEANUPS

In July 1995, Act 2 was enacted as, amongst other things, a "voluntary" environmental contamination cleanup program to address regulatory violations resulting from spills and releases into the environment. In 1997, regulations implementing the act were promulgated and a guidance manual issued. The act and associated regulations established technical and administrative requirements for site investigations, remedial action plans, cleanup standards, and liability protection for cleanups demonstrating attainment of these standards. Cleanup levels established by Act 2 are the governing cleanup standards for all remedial actions in Pennsylvania, including UST related cleanups in accordance with Act 32 regulations. A strong understanding of Act 2 rules and procedures underpins a thorough waste site investigation. Important elements of Act 2 applicable to actual or potential waste site impacts to PennDOT projects include the following:

- ❒ Site characterization requirements
- ❒ Statewide health standard attainment demonstration
- ❒ Site-specific standard attainment options
- ❒ Environmental Covenants and associated land use restrictions
- ❒ Special Industrial Area remediation requirements

At completion of a cleanup in Pennsylvania conducted in accordance with Act 2, the remediator receives a Release of Liability (ROL), provided proper standard attainment demonstration. The ROL provides liability relief from further cleanup requirements from PADEP and shields the remediator from third party claims for further action under environmental statutes. This ROL is transferrable to a third party such as PennDOT. Identification of properties that completed an Act 2 cleanup and received an ROL is important during waste site investigation, as discussed further under Phase I, II and III procedures.

Despite completion of Act 2 or Act 32 cleanups and receipt of an ROL or approved closure, respectively, environmental impact can remain following these approved cleanups. If this lingering impact is intercepted during transportation project earthwork, it could present a further waste management liability. A roadway project through a former release area where ROL has been achieved could still encounter unacceptable levels of soil and/or groundwater contamination requiring management during excavation dewatering. This existing impact could alter infiltrating stormwater BMP design, alter utility construction and installation and require utility pathway protection.

Under certain circumstances, an Environmental Covenant (EC) is recorded for sites closed under Act 2 specifically where an engineering or institutional control is required to achieve attainment and ROL. PennDOT must be aware of an EC prior to property acquisition and earth disturbance. **Unlike other restrictions that burden real property, the eminent domain acquisition process afforded PennDOT does not extinguish ECs.** Current PADEP regulations require every environmental covenant to contain a clause that allows the covenant to be terminated or modified when the property is acquired by PennDOT for use as highway right-of-way if all the following conditions are met:

- ❒ DEP waives certain requirements related to the environmental covenant
- ❒ DEP determines that termination or modification of the environmental covenant will not adversely affect human health or the environment

- ❒ DEP provides 30-day advance written notice to the current property owner, each holder, and, as practicable, each person that originally signed the environmental covenant or successors in interest to those persons

If an EC is not terminated PennDOT must abide by the soil and/or groundwater use limitations and contact PADEP to assure waste Special Provisions and/or a Waste Management Plan will detail what disturbance a transportation project Contractor can perform and what waste protection and management measures must be performed as a consequence of that soil or groundwater disturbance. An EC that is not terminated should be tracked in the Environmental Commitment Mitigation Tracking System (ECMTS).

Some Act 2 remediation requirements do not apply to Special Industrial Area (SIA) sites, allowing contaminated soil or groundwater to remain onsite in some cases. An SIA site is typically a former industrial property for which a redeveloper's remedial obligations are limited to making the site safe for its intended reuse, under the terms of a Consent Order signed by the redeveloper and PADEP. If PennDOT acquires property governed by an SIA Consent Order, landfill disposal may not be required for contaminated soil excavated during Construction. Depending on the terms of the Consent Order, PennDOT may be allowed to move excavated soil to a location elsewhere within the SIA site.

NOTE: Roadway/SEMP Section should be consulted if it is unclear whether a waste site with an Act 2 ROL, EC or SIA Consent Order could affect the transportation project.

4.3 SCOPE OF WORK DEVELOPMENT

PennDOT Publication 10B, *Design Manual Part 1B, Post TIP NEPA Procedures* states:

> Scoping involves the evaluation of a project's existing and proposed engineering features, assessment of environmental resources potentially impacted by the proposed project, and consideration of necessary public and agency involvement. Integrate the evaluation of engineering parameters and the evaluation of environmental resources in the Scoping Process. Engineering decisions should be made with consideration of environmental resources and the environmental consequences of implementing the decisions.

Waste sites are not the typical resource to which the highway transportation project will cause a detrimental impact. Rather, the highway project may be significantly impacted by the need to mitigate or remediate waste sites that threaten human health or the environment. Thus, the project engineering and environmental (E&E) scoping field view should include a preliminary review of potential waste sites that could impact the project, an activity that is strongly recommended for large projects. Findings, if any, are reported as part of the Categorical Exclusion Evaluation (CEE) documentation. If waste sites are identified, this information will provide a baseline for future site evaluation(s).

After the CEE is completed, the District may elect to conduct a preliminary waste site assessment to help with project planning, using a level of inquiry appropriate to the project. For example, a preliminary waste site assessment is normally performed for very large projects, and uses a broad scope at a low level of detail. It should be understood that this assessment is NOT a substitute for a Phase I.

A written and PennDOT-approved (District and, as applicable, Roadway/SEMP Section) scope of work is required prior to the initiation of any waste investigation. Review and approval of the Phase I and II investigations scope of work will be the primary responsibility of the District Environmental Staff, although the District's may request assistance from the Central Office Roadway/SEMP Section staff. **Phase III investigation scopes of work are required to be reviewed and approved by the Central Office Roadway/SEMP Section staff.** The Investigator, which may be PennDOT staff or more commonly a consultant, will develop a scope of work for each separate investigative phase.

The scope of work will be based upon the following:

Investigation Phase	Basis for Scope of Work
Phase I	Preliminary Engineering & Scoping activities
Phase II	Phase I findings and any additional PennDOT input

- ❒ A Phase II and Phase III investigation may be combined in a single scope of work submission.
- ❒ Phase III Assessments may facilitate or require additional/further Phase III investigations.
- ❒ All Phase III scopes of work and Phase I and II reports recommending Phase III activities must be reviewed and approved by Roadway/SEMP Section staff.

Phase III	Phase I, II or previous Phase III findings

With respect to Design-Build projects, in order to ensure that environmental impacts are clearly defined before contract advertisement occurs, it is recommended that required Phase II or III activities be completed before contract advertisement, to reduce the likelihood that excessive mitigation costs or project delays will disrupt Construction-phase activities and project costs. Where the District believes that a Phase II or III will not significantly impact a Design-Build project, the development of the Plans, Specifications and Estimates package for the project may proceed into the advertisement period if the requirements of Publication 448 are met.

4.4 WASTE SITE INVESTIGATION PHASING

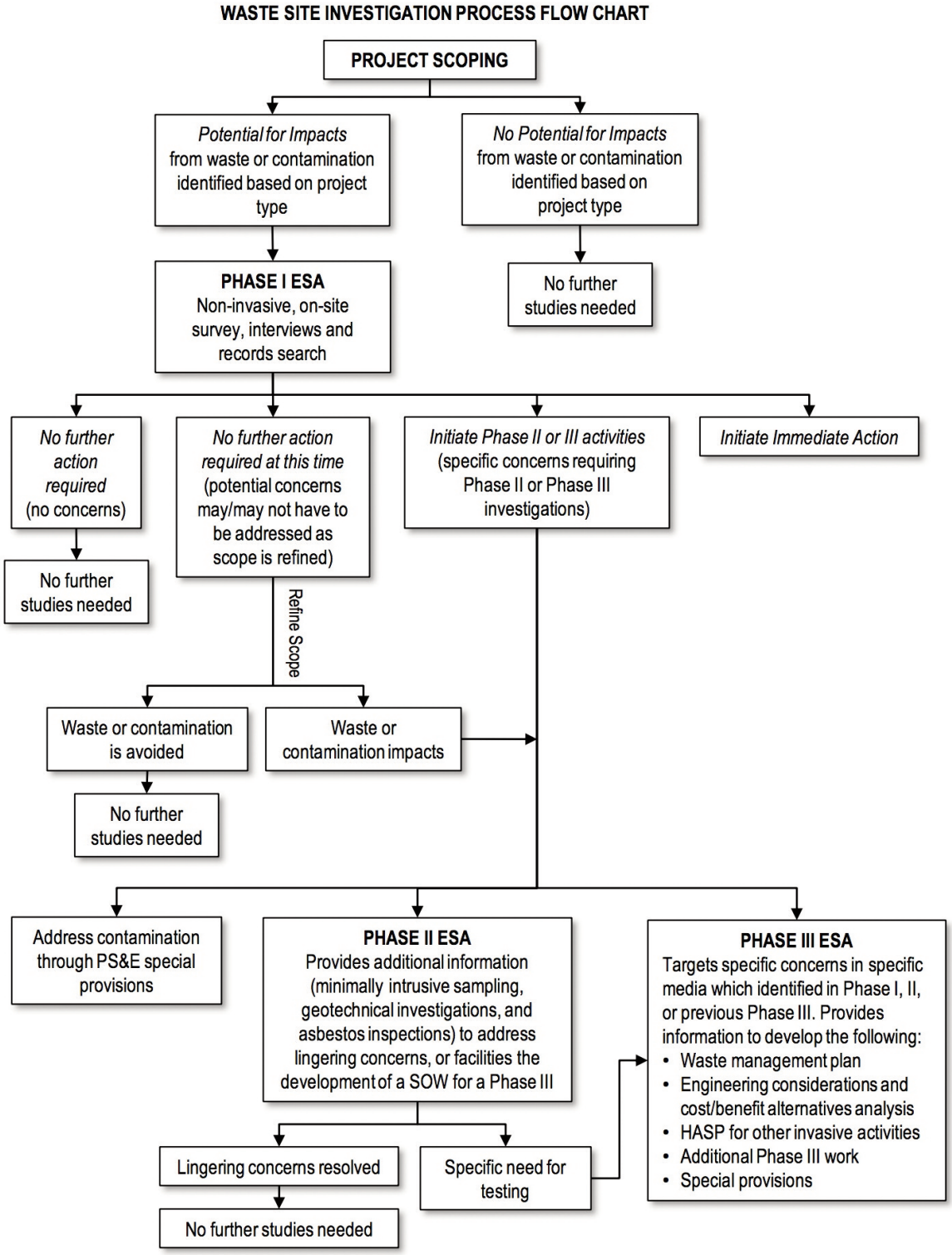
PennDOT's waste site investigation process and associated procedures are designed so that the site investigations can be conducted in phases, with increasingly focused scopes of investigation based on prior phase findings and inferred "gaps" in data and understanding ***(Figure 4-1)***. This is done to provide value to PennDOT throughout the investigation process so that monies are not overly encumbered and needlessly spent on detailed investigations. If the project no longer impacts the site because an alternate route is selected, or the project is eventually canceled, time and money spent on extensive studies at a preliminary stage of the TPDP would be lost.

The investigation process follows a basic sequence, as previously introduced, but can be modified based on the size and scope of the project. The Phase I investigation begins with a broad site information-gathering survey. A succession of more tightly focused investigations (Phase II or III) can then be conducted, based on the previous findings or as specific concerns arise, to adequately address the waste-related concern(s). With the commencement of Preliminary Design activities in the TPDP, the **engineering and environmental field view scoping** activities set the following parameters:

- ❒ **The project boundaries, study area, and level of detail required**. Study areas and levels of detail should be reflective of, and dependent on, the overall size and scope of the project. The essential first step before scoping the Phase I (or any of the other phases) is the geographic definition or boundary identification of the study area, termed the Project Study Area (PSA). The PSA can be an individual site or a collection of properties, for example properties on either side of a roadway corridor expansion/improvement project.
- ❒ **When a waste investigation(s) is not needed.** If it is apparent that there is no substantial potential for encountering waste or contamination, then no waste investigations are required. Indicate in the appropriate box under the Hazardous/Residual Waste Sites section on the Categorical Exclusion Evaluation (CEE), Environmental Assessment (EA), or Environmental Impact Statement (EIS) scoping form that no waste sites are present, and place a memorandum-to-file in the Project Waste Management File indicating the rationale for not performing a waste site investigation.
- ❒ **The basic timing of the waste site investigation(s).** Timing is, typically, based upon the scheduling demands resulting from the National Environmental Policy Act (NEPA)/Section 404 Process.

❒ **The waste investigation reporting requirements.** Depending on the project scope, these requirements may range from a simple synopsis to an extensive production with multiple reviews, presentations, and approvals.

Figure 4-1



In Preliminary Design, a Phase I is executed as the initial inquiry. A Phase I investigation is a standard, non-invasive records search, and on-site survey. The outcome of a Phase I investigation will find: (1) no concerns, (2) potential concerns that may or may not have to be addressed when the project scope is further refined, or (3) specific concerns which will result in the execution of a Phase II or Phase III investigation.

> **NOTE:** A Phase I investigation should be completed **prior to any invasive activities supporting project design processes**, including archeological investigations, waste sampling activities, geotechnical testing or drilling, in order to assess the risk posed to those individuals who may have a high potential of direct contact with site contaminants.

A Phase II investigation may occur in the Preliminary or Final design stage, and serves to bridge the informational gap between a Phase I and Phase III investigation. A Phase II may either supplement a Phase I investigation by providing additional information to address lingering concerns, or it may facilitate the development of a scope of work for a Phase III investigation. A Phase II investigation is fashioned to restrict costs by limiting activities to modest sampling, non-invasive geophysical operations and asbestos inspections.

Typically, a Phase III investigation will occur in Final Design. The Phase III is an investigation that targets specific concerns in specific media which were previously identified in the Phase I, II, or previous Phase III investigations. Phase III investigations may be performed iteratively. Phase III work plans or reports, or Phase I or II reports recommending Phase III investigations, must be reviewed by the Roadway/SEMP Section prior to execution of the Phase III work plan.

Lastly, with respect to PennDOT's Environmental Due Diligence (EDD) for fill requirements, as aligned with PADEP's Management of Fill Policy, information may be obtained from the completed Phase I to fill out the applicable portions of Forms EDD-VI and EDD-VII. For transportation projects requiring the completion of Step 2 on Form EDD-VII (export of fill with evidence of historic spill or release of an environmentally regulated substance), sampling records found during the Phase I records review may supply the necessary information to complete the form. However, in most cases where a spill or release is evident, the completion of Form EDD-VI and Form EDD-VII Step 2 may be subsequently satisfied by the Phase II or III investigation(s).

Although PennDOT forms EDD-VI and EDD-VII may make use of the various phases of waste site investigation information, they are not included in the Phase I, II or III final reports. Instead, the forms are maintained as separate records by the District office (Note that these forms must be maintained a minimum of 5 years in the project file). Section 6.4 herein provides further instruction on complying with PennDOT's management of fill requirements.

4.5 STAKEHOLDER RESPONSIBILITIES

Waste site investigations for a transportation project requires a "team approach" incorporating the Engineering District Design Project/Portfolio Managers and Environmental Planners, PennDOT Roadway/SEMP technical experts, consultant Designers and Geotechnical Engineers and principal and subordinate Investigators. The thoroughness and quality of results of the waste site investigation are a direct result of the close collaboration of the various stakeholders to the project. Provided below are waste site investigation responsibilities for the Engineering District, Central Office Roadway/SEMP and the Investigator. This section identifies when key team member collaboration is optional or required at strategic milestones in the investigation/design process and the form of that collaboration. Because a waste site investigation is iterative in nature, continued stakeholder communication throughout the design process is important to assure environmental concerns are mitigated cost effectively prior to or during construction.

4.5.1 ENGINEERING DISTRICT RESPONSIBILITIES

Within Publication 281, references to "the District" typically refer to the District Project Manager and District Environmental Support staff. The District holds primary authority and responsibility for the execution and administration of the waste site investigation procedures contained within this document. This includes, but is not limited to:

- ❒ ***Determining overall project scope***
- ❒ ***Retaining the waste site Investigator, approving the Project Study Area and developing the scope of work based on the planned excavation locations and depths***
- ❒ ***Coordinating investigative activities internally and externally to other PennDOT consultants and stakeholders, as necessary***
    - Establishing timeframes and maintaining schedules
    - Notifying and updating parties associated with the project
    - Establishing meeting times, locations and agendas
    - Obtaining property entry rights (Intent to Enter Notices or Agreements)
    - Ensuring proper cost accounting
- ❒ ***Ensuring proper reporting deliverables***
    - Satisfaction of investigation objectives
    - EDD Phase 1/2 requirements
    - P.G. or P.E. seal(s), as appropriate
- ❒ ***Maintaining the Project Waste Management File***

4.5.2 CENTRAL OFFICE RESPONSIBILITIES

References to Central Office indicate involvement with the Roadway/SEMP Section. Central Office will function as PennDOT's Chief Technical Expert in the areas of waste investigations, waste management, and pollution prevention. The Central Office staff will provide technical assistance to the Districts, upon request, in the following areas:

- ❒ Scope of work development
- ❒ Document review and recommendations
- ❒ Investigation or remediation oversight/management services when appropriate and feasible (usually reserved for Phase III investigations and other special circumstances such as the acquisition of larger parcels of land through Eminent Domain)
- ❒ Investigative services, when appropriate and feasible (usually reserved for Phase I or II investigations)
- ❒ Review and approval of contract Waste Management Plans and associated waste management Special Provision documents

4.5.3 INVESTIGATOR RESPONSIBILITIES

Investigator refers to the entity performing the waste site investigation(s). The Investigator must possess sufficient training, experience, ability, and equipment to properly conduct the investigation, provide an informed assessment, and produce an appropriate report. Typically, the Investigator will be a Consultant; however, if appropriate, the Investigator may include District and/or Central Office personnel.

The Federal all appropriate inquiry (AAI)/ASTM E1527-05 process establishes the minimum qualifications of an investigator performing the AAI Phase I. While the Department has chosen NOT to adopt the AAI process in Publication 281, the District staff may consider these criteria in review of the Consultant's qualifications.

SECTION 5 - PHASED SITE INVESTIGATION PROCEDURES

SECTION 5 - PHASED SITE INVESTIGATION PROCEDURES

Provided herein are recommended procedures for implementing the phased approach to waste site investigation. No site assessment can ensure that all environmental conditions of concern have been identified and evaluated. The phased investigation approach reduces uncertainty for the majority of a project to a reasonable level, in a cost-effective and timely manner, while identifying those sites that warrant further investigation. It is not, nor is it meant to be, an exhaustive assessment. It is a reasonable investigation that should be undertaken by PennDOT commensurate in scale to the transportation, construction or maintenance project the investigation is serving. The sections that follow step through each of the three phases of waste site investigation, in the intended order of implementation, recognizing room for flexibility and project/site-specific conditions.

5.1 PHASE I WASTE SITE INVESTIGATION PROCEDURES

The Phase I satisfies PennDOT's need for **appropriate inquiry** into the environmental characteristics of a parcel of real estate. As noted in Section 4.1, the investigative process provided herein is generally consistent with generally accepted real estate acquisition, building, and development practices and standards utilized to assess general site conditions, with further fitment to PennDOT transportation project and asset needs and requirements.

5.1.1 APPLICABILITY

In terms of transportation projects, a Phase I is intended to be applied in conjunction with **Preliminary Alternatives Evaluation of the PennDOT TPDP**, allowing for the "widest variety of alternatives to be considered, based upon the overall scope of the project." A Phase I should be completed by the end of the Preliminary Alternatives Evaluation. There should be no potential alternatives eliminated due to waste-related concerns at this point in the NEPA Process, unless those concerns are specifically identified and evaluated in the Phase I, for example an active CERCLA site.

The Phase I should be completed **prior to any invasive activities** such as archeological investigations, waste sampling activities, geotechnical testing or drilling, etc., in order to minimize the risk to those individuals who may have a high potential for direct contact with contaminants.

The level of inquiry to be utilized in a Phase I is **variable**, as discussed in the following text, and should be based upon the scope of the project and likelihood of encountering contamination based upon past and present land use.

Because the Phase I is performed during Preliminary Design of a transportation project, the District should re-review the Phase I if project plan changes made during Final Design involve the acquisition of additional right-of-way or will require an increase in the area or depth of planned excavation. The Designer and PennDOT Project Manager should keep in mind that plans for utility relocations, stormwater facilities, and sub-base drains are often not developed until Final Design. For example, a Phase I may recommend No Further Action at this Time for a gasoline retail facility, that may eventually require a Phase III groundwater investigation at a later date if Final Design utility relocation plans indicate the potential for trenching down to the water table alongside the gas station property.

For maintenance projects, or property acquisition and divestment, the Phase I should be implemented in accordance with Pub 284 generally and with Pub 281 specifically for waste concern identification and assessment. As with transportation projects, the Phase I should assess the entire maintenance project area or property or facility planned for acquisition/divestment, to ensure that "all reasonable" inquiry is achieved, and known or suspected environmental concerns or AOCs are identified for potential further investigation.

5.1.2 PARTICIPANTS AND RESPONSIBILITIES

The Investigator is the entity that is responsible for performing the environmental investigation and produces the Phase I report. The Investigator may include Consultant, District, or Central Office personnel, who possess sufficient training and experience necessary to conduct the environmental investigation and produce the final report.

The District is responsible for all aspects of a Phase I scoping, implementation and reporting. The District should provide the Investigator with a description of the transportation improvement project, including the following:

- ❒ Transportation project planned right-of-way (ROW), with delineation of the PSA)
- ❒ Conceptual understanding of principal transportation project features like embankments, ramps, piers, lane additions, signage, utilities, stormwater features and the like
- ❒ Anticipated locations and depths of excavations, as conceptually understood in the early phase of design. Utility excavations will need to be estimated, since utility relocation planning does not occur until Final Design
- ❒ Possible property takings
- ❒ Stormwater Best Management Practices (BMPs), to the extent known

The District is **not required** to submit a Phase I report to any regulatory agency for concurrence. **However, Phase I reports which recommend a Phase III investigation(s) must be submitted to the Roadway/SEMP Section for review and comment before the report is finalized.** Assistance from consultants, Central Office staff, or regulatory agencies can be utilized on an as-needed basis.

5.1.3 SCOPE AND PERFORMANCE

A Phase I typically consists of the following components, generally performed in the following order:

1. **Investigation**
   a. Historical Records Review
   b. Site Reconnaissance
   c. Interviews
   d. Site Sketch

2. **Assessment**
   a. Information Reduction
   b. Information Evaluation
   c. Recommendation

3. **Reporting**
   a. Draft Report
   b. Final Report

This section reviews procedures associated with the investigation and assessment portions of the Phase I. Guidance for reporting the Phase I is provided in Section 6.0.

5.1.3.1 INVESTIGATION

PennDOT's experience with conducting Phase I investigations has shown that there is a preferred order of execution of investigation tasks. Understanding there will always be situations to the exception; the preferred order of completion is approximately as follows:

- ❒ Once authorization to proceed is granted, the Investigator should initiate available records collection and review as early as possible. Records should be reviewed as collected to begin to identify actual or suspect waste AOCs and sites of concern relative to the transportation or maintenance project earthwork, according to the currently understood concept.
- ❒ Key stakeholders for interviewing should be identified at the same time as records collection, along with production of a suitably scaled site sketch base map or plan or set of plans per the scale of the PSA.

- ❒ Once available records have been reviewed for as much familiarity with the PSA as possible, the site reconnaissance should be performed to ground truth records and early suspicions and find additional clues regarding the potential for obvious or hidden waste sources.
- ❒ Interviews, as applicable and appropriate, should be combined with the site reconnaissance, where possible, for value to PennDOT, otherwise complete soon after the reconnaissance.
- ❒ The site sketch should be developed with pertinent environmental findings in the field during the reconnaissance, complimented with AOC photographs and field notes, for further refinement during information reduction and evaluation.

Once the available information from the above tasks is adequately gathered, the information is reduced and final evaluated by the Investigator for identification of future potential risk to the project, potential information/data gaps in understanding an AOC/site of concern/risk to the project, potential risk mitigation options and recommendations. This general Phase I investigation process is reviewed in detail in the sections that follow.

RECORDS REVIEW

The Investigator begins by performing a paper study of the records which are **practically reviewable[1] ***, as determined by the District and relevant to the PSA for indications of hazardous and environmentally sensitive waste(s), practice(s), or material(s). As an aid to the Investigator, a list of practically reviewable records is provided in the Phase I Waste Site Investigation Checklist in Appendix A. These records are available through computer search services and vendors or as found by the Investigator, for example a search of regional PADEP files.

During this phase, the investigator may also determine if review of "historic resource documents" such as those describing historic operations or practices at the subject and/or surrounding properties is warranted or beneficial to the investigation. Such documents may be located with the help of District contacts or local historic societies, if present, and can be obtained for review during subsequent phases of the investigation described below.

A PADEP file review may or may not be warranted, depending upon the risk of project impacts from suspect waste sites in the project area. For example, a PADEP file review may not be necessary if project excavations will be very shallow, for example a sidewalk replacement, there will be no property takings from suspect waste sites, and Historic Fill or other waste has not been used as surface fill. If a computer database search suggests the historic or current presence of regulated or unregulated USTs, or if a site reconnaissance indicates USTs are suspect at a site, PADEP files should be reviewed to confirm registrations or enforcement actions, cleanups and the like.

As indicated in Section 4.0 and on the Phase I Checklist in **Appendix A**, the Investigator should identify all Act 2 ROLs and ECs in the project area as part of the Phase I. The Investigator should also take care to identify ECs on any properties that may be acquired within the project area. In addition to being associated with identified waste sites, EC's may impose activity and use limitations that are incompatible with property use for highway right-of-way. Most ECs also require PADEP and any Holders (i.e. stakeholders) to be notified in the event of a change in property ownership or land use, such as would result from a PennDOT property taking. This information may be found in the property records maintained by the County Recorder of Deeds. The PADEP also maintains a GIS database of all environmental covenants that it has approved, the "Activity and Use Limitation Registry," that may be found at http://www.depgis.state.pa.us/pa-aul/ (installation of Microsoft Silverlight™ will be required).

Following the records review, but prior to the site reconnaissance/interview, the District, at its discretion, may require the Investigator to inform the Department of those sites requiring closer examination. Should the District determine that inquiry beyond the Phase I is warranted, the District may choose to combine a Phase II with the current Phase I. For example, the District may determine that Phase II investigation activities performed in coordination with and coincidently to the Phase I are necessary in order to assess the risk to workers performing other invasive tasks, such as archaeological investigations and geotechnical drilling. Expediting or paralleling the Phase II with the Phase I may contribute to decreasing the cultural resource

assessment critical path and be essential for worker health and safety planning during cultural assessment activities.

The most common waste sites encountered on highway construction projects are underground storage tank (UST) sites. These sites are typically encountered at current and former fueling station locations along existing transportation corridors. However, underground tanks may be located in commercial and/or residential areas.

NOTE: Typical underground storage tanks include, but are not limited to: **heating oil, gasoline, diesel, and septic.**

The initial focus of a Phase I at known or suspect UST sites is to verify the presence and determine the location of any USTs, current or historical, within the proposed highway project right-of-way, and to make a "reasonable assessment" of whether contaminated media exists and its extent and volume as a result of localized spills or tank leakage.

A "reasonable assessment" does not necessarily require geophysical studies to be conducted, soil borings to be completed, or monitoring wells installed. However, the determination of tank locations and the likely existence of contamination are necessary for assessing the following impacts on the highway development project:

- ❒ Required remedial actions, if any
- ❒ Worker health & safety issues

Records reviews, particularly PADEP records review, should focus on the following lines of information for active/regulated storage tanks:

- ❒ tank farm location
- ❒ site compliance history
- ❒ tank registration history
- ❒ compliance with upgrade requirements
- ❒ leak detection history
- ❒ reportable and confirmed release reports
- ❒ USTIF claim records
- ❒ the age of the tanks

Active UST sites require registration under Act 32. The registration application requires a tank location sketch to be included, therefore the location of these tanks is generally known and tank locating investigations are not necessary, provided that site reconnaissance confirms the accuracy of these records. As an exception, the precise determination of a UST location is recommended where the right-of-way boundary passes close to the inferred UST location.

For active USTs installed before 1999, records should be found documenting compliance with the UST system upgrade requirements of PA Code §245.422. Releases are more likely from USTs not meeting these requirements.

Insurance claims filed by private parties in response to a product release from a UST may be transferred to PennDOT as part of the ROW acquisition. Therefore, it is important for the investigator to obtain documentation of releases and ongoing investigation/remediation work completed under a USTIF claim, either through records review or property owner interviews.

When records are found, like those provided by a computer database search, indicating or suggesting abandoned or unregulated tanks ("pre-Act 32" or "pre-Act") may be present at one or more sites within the project area, the same records review process for active tanks should be followed. However, it should be noted that abandoned USTs are generally not registered with the PADEP. Prior to enactment of Act 32, the Fire Marshal's Office of the Pennsylvania State Police was responsible for the permitting of fuel storage tanks. This may be a better source of information than the PADEP for these Pre-Act 32 tanks. In many instances, installation of a pre-Act UST system required permits, like a building permit, from a local township or borough, often times requiring submission of design plans showing at least generic tank system layouts, but possibly with specific identification of installation location.

In addition to the lines of evidence identified for active tanks, the following additional information may be appropriate for unregulated tanks:

- ❒ Obtaining documents, such as regulatory closure reports or owner/operator records of closures, including photographs….this can substantiate that tanks have been removed
- ❒ Verifying information contained in Phase I records
- ❒ The additional records review task can be conducted as a supplement to the Phase I, prior to determining the full scope of the Phase II. The records review can also be incorporated, as the initial task, with Phase II tank locating tasks.

SITE RECONNAISSANCE

The Investigator conducts a detailed, **noninvasive visual inspection** of the entire site and adjacent properties for indications of wastes or environmentally sensitive contaminants, either suspected from records reviews and interviews, or independent of these. The site reconnaissance is usually best performed following substantial accumulation and review of available records to assure suspect areas of concern are not missed during the reconnaissance, or to avoid a follow-up visit. Refer to the Phase I Checklist in ***Appendix A*** for guidance during the reconnaissance. The Investigator is strongly encouraged to utilize photographs to document the existing conditions and findings on the site. The site sketch is utilized during the reconnaissance to locate AOCs by hand or with taped measurements off identifiable fixed features. Use of a hand held digital global positioning system (GPS) is required.

Due to their frequent occurrence, it is crucial for the Investigator to collect all available information concerning USTs. Items such as **fill pipes, vents, dispensers, islands and canopy remnants,** should be noted and utilized to the maximum extent to establish the locations and potential impacts of USTs and associated piping on projects. Oil/water separators, septic tanks/fields, floor drains, waste oil tanks, antifreeze tanks and fuel oil tanks are also potentially present at active or historical fueling stations. As part of the "wastewater or other discharge" item on the Phase I Checklist, the Investigator should identify and provide the location of any third-party illicit discharges into PennDOT's stormwater system, for follow-up action by the District. The definition of an illicit discharge is found in Section 7.0, Glossary. Guidance concerning District follow-up action and illicit discharge report processing is found in Publication 23, Chapter 8.

The District must provide copies of its Intent to Enter letters to the Investigator prior to the site reconnaissance. No individual in the employ of the Department may enter private property unless an Intent to Enter has been served, written permission to enter has been obtained by the Department from the property owner or lessee, or the property owner or lessee is present and gives verbal permission to enter and is witnessed by at least two members of the team conducting the site reconnaissance.

Individuals taking part in the site reconnaissance must meet training and certification requirements established by the Occupational Safety & Health Administration (OSHA). Prior to conducting the site reconnaissance, these individuals should familiarize themselves with the findings of the records review and identify any potential hazards. It is recommended that the Investigator utilize a generic Health & Safety Plan (HASP), or at a minimum, a health and safety checklist for the site reconnaissance, as a Phase I HASP is considered by PennDOT to be an incidental item to the Phase I investigation.

INTERVIEWS

The Investigator reasonably attempts to interview persons with knowledge relevant to the Phase I and identification of actual or suspect AOCs. Care should be taken to identify interview candidates that can provide a fair and accurate assessment of the property or an historical practice, especially if that practice is not allowed or is not conventional today. Individuals of particular interest can be identified by the Districts, especially when a Phase I is being performed for a PennDOT facility, like a maintenance facility. The District can also provide owner information for properties acquired or to be acquired by PennDOT. Refer to the Phase I Checklist in **Appendix A** for a recommended listing of interviewees.

Selecting individuals to be interviewed may vary extensively with the project and surrounding circumstances. The Investigator should limit interviews to those individuals who are thought to have knowledge of releases at or from sites in and around the project area. These individuals may also be aware of specific contamination that may be found in soil or groundwater at specific locations within the project area. Generally, the Investigator should interview owners and operators of individual sites of concern.

When information is given by past site owner and/or operators concerning the removal of storage tanks, the Investigator should evaluate this information carefully. Follow-up inquiries should be made concerning the tank removal contractor, and any existing closure reports, memos or letters indicating that tank removal activities were conducted, including photographs if available. It is not uncommon that an owner of record of a current business has no information regarding the abandoned pre-Act tanks under their property because there was no mention or identification in the deed or sale agreement. Additionally, it is not uncommon that current property owners were told at time of sale that a UST system was once on site, but had been removed, when in fact it was left onsite. Therefore, statements that no USTs currently exist on a site may be truthful, but such statements may not be accurate.

The Investigator must maintain written records of all interviews, including the individual's name, position, relationship to the current or historical use/business of interest, location and time of interview, telephone number, address, and the content of the interview. A standard interview form aids lines of questioning, documentation of critical information, later evaluation and final reporting.

SITE SKETCH

The Investigator develops a site sketch from a prior prepared, suitable basemap. This basemap should be scaled whenever possible. The base map can be an air photograph, or a design plan depending on when the Phase I is performed. The Phase I Checklist in ***Appendix A*** contains recommended components for a site sketch. The District may scope the Investigator to include additional site sketch components, as appropriate for the project. Use of a handheld GPS to develop the site sketch is required.

In general the Phase I guidelines should be followed; however, when the site reconnaissance has verified the location of tanks, fill pipes, vents, or fuel islands this information must be provided on the site sketch to assist in determining the impact of the site on the project.

> **NOTE:** Site Sketches may include, but are not limited to: existing roadways, the general location of the property in relation to the proposed transportation project, approximate distance measurements, a north arrow, any areas previously known or suspected to contain contaminants, structures (existing or previous) and natural features like water bodies and courses, suspect wetlands or mature woodlands (suggesting no recent surface uses).

5.1.3.2 DATA ASSESSMENT, EVALUATION & RECOMMENDATION

Data review is the single most important effort after thorough data collection commensurate to the scale of the project. Focus on:

- ❒ AOC (source of regulated substance release) identification
- ❒ Actual or suspected presence of USTs and associated features
- ❒ Actual or suspected groundwater impact relative to deep excavations

- ❒ Groundwater quality and elevation relative to planned stormwater BMP's and associated features

INFORMATION COMPILATION

The Investigator gathers and organizes all information from the investigation. All original data gathered should be made part of the project's technical files, and ultimately becomes the property of the Department. Suggestions to compile information to improve evaluation include:

- ❒ Risk matrix table. Prepare a table structured per sites of interest and AOC relative perceived risk to construction
- ❒ Bring investigator experience to the table to weight the risk
- ❒ Not sufficient to simply identify a collection of AOCs/release areas. Investigator must use their experience to put the AOCs into the context of the planned transportation project construction and perceived risk.

INFORMATION EVALUATION

The Investigator studies the compiled data, and evaluates the impact of the known environmental conditions on the highway project, maintenance project or property evaluation. The Investigator assesses the accumulated information for gaps in understanding of actual or potential releases of regulated substances. Accumulated evidence may only suspect some concern or concerns at completion of the Phase I and may not provide definitive proof of a release, historical or current. Suspect AOCs are as important as confirmed releases at the early Phase I stage of investigation and commonly form the basis or rationale for proceeding to another phase (II and/or III) to accumulate information that then confirms/denies the release. Conversely, if the Phase I provides conclusive evidence of the occurrence of all reasonable AOCs, then further waste site investigation may stop, or stop at this time until the project advances further into Final Design or acquisition/divestment.

Should the Investigator or the District determine that additional, reasonably attainable records review, site reconnaissance, or interviews are needed in order to complete the evaluation of data (involving no change in Phase I scope of work), then every reasonable effort should be made to obtain the information to support the Phase I conclusions.

After completion of the Phase I, the following questions should be asked:

- ❒ Is the property a full or partial right-of-way take and will it include the actual or suspect AOC?
- ❒ Is contamination evident, suspected, or not identified?
- ❒ Have tank location(s) been verified? If so, are the tank(s) within the proposed or existing planned transportation project right-of-way, or is it unclear their relationship to the ROW?
- ❒ If the transportation project intercepts actual or suspected impacted soils and/or groundwater, how would the soils and groundwater be classified in terms of waste regulations, Management of Fill Policy and Act 2?

Although active tanks may currently be in compliance, the site history should be carefully evaluated to answer the following questions:

- ❒ Were/Are older (pre-Act) tanks located at the site?
- ❒ Are the current compliant tanks installed in the same area where the pre-Act tanks were removed?
- ❒ Is petroleum-contaminated media still present at the pre-Act tank locations?

If the answer to any of the above questions is yes or possible, then the Phase I should consider the active system or portions of the active system could be associated with released regulated petroleum hydrocarbons, warranting a further phase of investigation. The first two questions above are still considered activities within the scope of the records review portion of the Phase I and should be answered with additional information searches, as required. Non-powered sampling tools may be useful for sampling stained surface soil during

Phase II screening activities, but they are usually unsuitable for sampling soils from the depth of a potential UST release. Therefore, determining whether petroleum-contaminated media exists, if necessary, usually requires intrusive sampling activities as part of a Phase III.

Abandoned or unregulated USTs will generally not have a significant monetary or schedule impact on the highway project, except when unexpectedly encountered. Remedial costs for unexpected tank removals are not necessarily significantly greater than planned removals. However, the monetary impacts associated with unexpected tank removal such as delay claims filed by the general highway contractor or activities implemented under a force account basis can significantly increase the cost of the tank closure and regulatory compliance.

It is for this reason that locating abandoned tanks is an important task in the waste site investigation process. It is possible that the location of abandoned tanks can be determined during the Phase I. The Phase I record search may provide accurate tank locations, eliminating the need for further location verification in later phases. In cases where the Phase I has provided the location of the tank(s) at the site, it is **not** imperative to conduct a soil boring program to assess "potential" soil or groundwater contamination. The rationale for this is as follows:

If the tank is unregulated, then disposal of petroleum-contaminated soil related to this tank may be limited to the obvious contamination directly around the tank and which may be reasonably intercepted by the transportation project, or which may represent a future point of exposure given the proposed reuse of the property. Using this assumption, contaminated soil volumes and cleanup costs can be accurately estimated. Disposal costs for petroleum-contaminated media, which is exempted from classification as Hazardous Waste, is usually inexpensive compared to hazardous waste disposal costs.

Lastly, knowledge of the location and estimated costs to remove the USTs is sufficient data for the Federal Highway Administration (FHWA) to determine site impacts, to satisfy the NEPA requirements, and for satisfying CERCLA due diligence. If the Phase I cannot reasonably determine the number and location of USTs/UST system(s) and the magnitude of associated impact, or not, and there is some probability that the project will wholly or partially encroach on the situation, then the prudent path forward is to advance to a Phase II/III level of investigation.

> **NOTE:** It has been the Department's experience in the review of the site characterization studies that historic soil contamination is usually found directly beneath the tank. Contaminants remaining from these historic releases typically have been flushed from the soil to groundwater. Hence, calculating a volume of impacted soils for use in determining highway project impacts and contract specifications does not necessarily require an extensive soil boring effort.

AOC GROUNDWATER ISSUES

In instances where PennDOT is not liable for source-area remediation, contaminated groundwater requires no further action if highway construction will not intersect the groundwater table. The Investigator must consider the impact of a waste AOC which has or is likely to have impacted groundwater or tank removal, for example cut and fill areas, drainage controls and footer depths on the highway design. Where groundwater will be reasonably intercepted during earthwork, groundwater impact suspected at the Phase I level of investigation must be considered a real risk until later more intrusive phases of investigation confirm or refute the risk.

Contamination in excavation areas poses risks to worker health & safety and can require treatment & disposal of contaminated groundwater during dewatering operations. In many instances, permits are required to discharge treated or untreated groundwater to waters of the Commonwealth or sanitary sewer systems. *When there is a reasonable suspicion that groundwater may be intercepted by construction activities near UST locations, an assessment of groundwater contamination* ***must be conducted.*** Therefore, the Phase I should recommend moving to a Phase III at least in the vicinity of and potentially hydraulically down gradient of suspect USTs/systems.

Determination of groundwater quality is essential where waste site evaluation is undertaken for potential facility/property acquisition. Groundwater impacted with regulated substances sourced from a location on the

property being considered for purchase has the strong potential to be an eventual remedial obligation to PennDOT, if the seller does not complete/continue to complete the environmental cleanup. Conversely, impacted groundwater beneath the site of interest for purchase, that is sourced from an offsite, hydraulically up gradient site, not otherwise contributed to by an on site source, may not be a future remedial obligation. The Phase I should make every attempt to gather information regarding these two scenarios, then weigh the potential for either situation to exist, or not, make reasonable conclusions regarding potential impact to PennDOT, identify early possible mitigation options, if the project is followed through with as planned, and make logical recommendations for further information gathering to more definitively answer impacted groundwater/source suspicions.

AOC VAPOR MIGRATION ISSUES

Act 2 guidance procedures for the characterization of the vapor migration pathway for volatile contaminants may be found on the PADEP Land Recycling Program web site (search by subject under "L" at http://www.dep.state.pa.us). The vapor intrusion guidance provides Decision Matrix flowcharts for soil and groundwater, as well as screening value tables for soil and groundwater. The need for soil gas or indoor air sampling is triggered by the presence of petroleum substances in soils within 30 feet of a point of access or non-petroleum substances within 100 feet of a point of access. Vertical separation distances are 5 feet and 15 feet for adsorbed or dissolved-phase petroleum substances and separate phase hydrocarbons, respectively. Petroleum-contaminated soil beyond these lateral and vertical separation distances is not considered a potential migration threat to the point of access. Non-petroleum substances have no vertical separation distance. **Therefore, where volatile contaminants are known or suspected, the Phase I should provide information concerning the distance and locations of buildings and buried utility lines to the known or suspected contamination.**

STORMWATER BEST MANAGEMENT PRACTICES

Candidate locations for stormwater BMPs must be evaluated for actual or potential regulated substance releases similar to other transportation project features. A stormwater BMP often times drives an entire property acquisition in a commercial roadway improvement project where otherwise strip takings satisfy the balance of the project land needs. Acquiring an entire property, complicated further with for example historical past practices of gasoline storage or garment dry cleaning, increases the risk of acquiring levels of soil and groundwater contamination that reach beyond waste management during construction, to a more involved Department remedial obligation with severer liability and mitigation cost concerns. That is reason enough for close scrutiny of full property takes during a Phase I. Add to that the intention to install an infiltrating stormwater BMP, the PADEP preferred management alternative, and the actual or suspect presence of historical impact heightens Department risk and investigation requirements to understand that risk. The occurrence of large scale impact could disqualify the site for an infiltrating BMP, or drive BMP design to a closed, bio-retention type system, which is more complicated to design, permit and operate.

Potential contaminant issues associated with stormwater basins, particularly infiltrating systems, include:

- ❒ Waste soil excavation and reuse
- ❒ Contaminant leaching and groundwater plume amplification
- ❒ Contaminated groundwater flux into a basin or along the inlet/outlet structure
- ❒ Impermeable liner buoyancy and hydraulic heaving

Stormwater basin candidate sites require evaluating the soil column beneath the planned footprint or general area of the eventual footprint where soils will be removed to install the basin and the deeper zone of infiltration, which may extend to bedrock. Contaminated soil excavated to form the basin may not be able to be reused to grade the basin or grade unrelated areas and may require offsite disposal as a waste if one or more contaminant concentrations exceed Act 2 Statewide health standard, soil-to-groundwater standards for the BMP or other ROW setting. Deeper soil below the planned zone of excavation targeted to accept and treat infiltrate could instead leach soil sorbed contaminants deeper to groundwater creating or exacerbating groundwater impact. Separate phase petroleum floating on a water table beneath a candidate BMP location can be redistributed by BMP induced water table mounding and be a renewed/amplified source of dissolved

phase impact. Natural groundwater mounding in response to seasonal and local precipitation events can flux into an unlined basin, introducing dissolved contamination that could discharge to and impact surface water. Natural groundwater mounding can heave and tear impermeable liners if not adequately counter balanced when submerged, providing a stormwater conduit(s) to groundwater and potentially short circuiting the performance of at least a portion of the basin.

The Phase I must begin to determine suspect or actual AOCs in the planned footprint of a proposed BMP or generally within the concept location to begin to understand risks to the planned BMP. Early suspicions of candidate site inadequacy must be communicated to the Department Project Manager and especially the Designer to assure site acquisition and planned use are evaluated relative to further investigation, accordingly. Depth to groundwater and bedrock are important to BMP design, and may not be fully answered by a Phase I, but the Phase I should attempt to determine both to help guide the need for further evaluation or raise early concern that a site may not be a candidate site for a BMP, for example due to shallow bedrock, or a high water table. The Phase I should attempt to provide the following information, reasonably available through existing sources, for candidate BMP sites/locations, however preliminary:

- ❒ Soil type and permeability
- ❒ thickness/depth to bedrock
- ❒ Depth to groundwater
- ❒ Soil AOC occurrence and soil quality
- ❒ Groundwater quality

RECOMMENDATIONS

The Investigator develops one of the four following recommendations for further action at sites where environmental conditions of concern were noted, using the available data and Investigator experience:

- ❒ ***No further action required***

In this case, data indicated there is **no significant impact** to the highway project.

- ❒ ***No further action required at this time*** (Specify actions and times)

  In this case, data indicates **minor, easily handled or questionable amounts of contamination.** If there are minor or easily handled amounts of contamination, it may be addressed by a special provision in the Plans, Specification and Estimate (PS&E) package (Final Design). If there is questionable contamination, no action should be taken until the focus of the project has been refined, and/or appropriate action (if any) is determined by the District (or Central Office Roadway/SEMP Section).

  The recommendation "No further action required at this time" may be used where a significant likelihood of contamination exists outside the proposed right-of-way (ROW), but the precise ROW boundaries have not yet been finalized at the time of the Phase I. Consequently, when ROW boundaries are changed or selected during Final Design, the Phase I must be consulted to determine if further investigations are needed. "No further action required at this time" should not be used if intrusive activities are likely to occur later in Design in suspect waste site locations.

  This recommendation often involves sites where contamination is documented or suspected for small partial/strip/sliver property acquisitions. In these circumstances, PennDOT should coordinate with the regional PADEP office to determine the scope of required remedial investigation and/or actions, and to assess whether the current site owner/operator will be completing these activities. **PennDOT should make every effort to facilitate clean up of the site by the owner.** If it is determined that the owner/operator is negligent in their cleanup responsibilities, PennDOT should then review the need for all further actions, i.e. conducting a Phase III or design modifications.

Under no circumstance should the "No further action required at this time" designation be used in order to put off further investigations until the Construction phase if there is a significant risk of environmental contamination, worker exposure to contamination, or construction project delay.

❒ ***Initiate Phase II or Phase III activities*** (Identify specific concern(s), reason(s) for concern and specific steps needed to adequately address the concern(s)). Under these circumstances, data indicates an obvious or strong likelihood of **significant materials contamination (hazardous or non-hazardous).** A Phase II is recommended to gather additional information in a cost-effective and timely manner in order to complete the assessment. A Phase III is initiated when a more comprehensive or invasive study is needed. Based upon the apparent type and amount of contamination identified, the District decides which phase is appropriate.

NOTE: For Phase I or II reports recommending Phase III activities, the District must receive Central Office Roadway/SEMP Section concurrence..

A Phase II or III should be undertaken if the Phase I does not verify tank locations, or there is a reasonable likelihood of significant contamination. In the event the only additional information required is the location of the tank(s), a Phase II geophysical investigation should be conducted. The general intent of a Phase II is to conduct a non-invasive field assessment. This may involve limited sample collection, in order to identify contaminants of concern when site-specific contaminants have not yet been identified, provided that the samples may be easily collected using hand tools.

For releases from regulated USTs, the Act 32 regulations now state that the tank owner is presumed liable for contamination of all supply wells within 2,500 feet of the release, and the regulations also require a rebuttal of this presumed liability. Consequently, if the Phase I identifies a known or likely release from a regulated UST, the Phase II or III investigation should include a regional well survey, to support possible offsite groundwater sampling during the Phase III should a groundwater impact be discovered onsite.

In most instances of UST releases, the Phase II criteria of limiting sampling to surface sampling would not prove beneficial for tank investigations. However, if contaminated surface soils are evident, samples may be collected in Phase II and analyzed according to the appropriate PADEP Short List of Petroleum Constituents. If subsurface soil samples are needed, the District should proceed directly to a Phase III. The Phase III can be scoped to include a geophysical survey, if this is needed also.

❒ ***Initiate immediate action*** (Specify actions)

In this case, serious contamination is present on, or migrating toward, Commonwealth-owned or leased property which will likely result in the substantive detriment to life, the environment or property if immediate action is not taken. ***In such cases, the Investigator should coordinate with the District and Central Office as soon as possible.***

This recommendation will not be applicable to active UST sites. Any required remedial actions, as a result of imminent threats to human health and the environment, are the responsibility of the current owner/operator.

5.2 PHASE II WASTE SITE INVESTIGATION PROCEDURES

A Phase II is limited to minimally intrusive soil, sediment and water sampling and geophysical investigations for USTs at sites with waste related concerns identified in the Phase I. The Phase II is intended to provide additional information following or in conjunction with a Phase I that can be used to determine if the use of special provisions are sufficient to handle any waste materials on a site during transportation project construction, or if a larger scope, more intrusive investigation is required, for any type of project. If this investigation indicates that a Phase III is warranted, the data obtained from the Phase II should be used to develop the Phase III sampling plan.

5.2.1 APPLICABILITY

The Phase II may be completed during Preliminary Alternatives Development and Review, and should be completed by the conclusion of Detailed Alternatives Development and Review of the TPDP. In some instances, an ACM survey can be conducted as late as Final Design.

The primary focus of a Phase II is to verify the presence or absence and location of underground storage tanks within the proposed highway project right-of-way, or a maintenance project or property acquisition, that could not be determined during the Phase I. Where the Phase I looked at all properties within the PSA, the scope of sites subjected to the Phase II may be very limited, being only those with waste features that need further clarification to assess or remove concerns, and may only focus on properties with actual or suspect USTs.

The Phase II procedures are limited to the collection of soil and/or water samples that can be obtained with non-motorized equipment and the use of surface geophysics to help locate and orient USTs and UST systems. Thus, a Phase II field investigation in association with a UST is limited to noninvasive techniques for locating the suspected UST(s).

> **NOTE:** If soil samples can be obtained at depth without using motorized equipment, this activity may be conducted under the Phase II. When tank locations are unknown and/or the Phase I data suggests, or design concerns warrant, the installation of subsurface borings, the District should proceed directly with preparing a Phase III scope of work, incorporating the Phase II tank locating investigation.

Additionally, Asbestos Inspections may be conducted during the Phase II. The Asbestos Inspections documents the presence, location, type, and quantities of asbestos containing material (ACM) by analyzing samples obtained from suspect ACM. **The ACM survey report must be a stand-alone document; however, it can be incorporated into the Phase II report as an appendix at the discretion of the Department.** It is PennDOT policy that both indoor and outdoor Asbestos Surveys must be conducted by an inspector possessing current Asbestos Building Inspector certification from the Pennsylvania Department of Labor and Industry.

Facilities such as buildings and bridges must be inspected for asbestos prior to demolition or major renovation, in accordance with 40 CFR 61 Subpart M, the National Emission Standards for Asbestos, under NESHAP Federal regulations promulgated on November 20, 1990. 40 CFR 61 Subpart M requires USEPA notification of all demolition activities, and for those renovation activities involving the removal of structural support members, whether or not the facility contains regulated quantities of asbestos. For renovation activities that do not involve the removal of structural support members, USEPA notification is required only if the renovation will disturb regulated quantities of asbestos. For additional information concerning asbestos-containing material management, please refer to Publication 611, Section 7.0.

5.2.2 PARTICIPANTS AND RESPONSIBILITIES

The Investigator is the entity that is responsible for performing the Phase II investigation and produces the Phase II report. The Investigator may include Consultant, District, or Central Office personnel who possess sufficient training and experience necessary to conduct the Phase II investigation and report the findings.

Act 194 of 1990, the Asbestos Occupations Accreditation & Certification Act (as amended by Act 161 of 1998) requires asbestos inspector certification with the Pennsylvania Department of Labor and Industry. Though this certification is legally required only for workers who perform indoor asbestos inspections, PennDOT requires this certification for outdoor asbestos inspectors as well, in order to ensure that all PennDOT employees and contractors who perform asbestos inspections are properly trained.

The District is the ultimate authority for all aspects of a Phase II. The District is not required to submit a Phase II report to any regulatory agency for concurrence; however, Phase II reports that recommend a Phase III investigation(s) must be submitted to Roadway/SEMP Section for review and comment before the report is finalized. Roadway/SEMP Section approval is not needed to move forward with a Phase II waste site investigation if the District concurs with the Phase I findings and has approved the Phase I report. Assistance from consultants, PennDOT staff, or regulatory agencies, can be utilized on an as-needed basis.

5.2.3 SCOPE AND PERFORMANCE

A Phase II consists of the following sections generally performed in the following order:

1. **Investigation**
   a. Sample Collection
   b. Sample Analytical Requirements
   c. UST Investigation Requirements

2. **Assessment**
   a. Compilation of Data
   b. Evaluation of Data
   c. Recommendations

3. **Reporting**
   a. Draft Report
   b. Final Report

Investigation and data assessment procedures are discussed below, with Phase II reporting requirements provided in Section 6.0.

5.2.3.1 INVESTIGATION

Sample collection during the Phase II is limited to soil and sediment samples that can be obtained by hand or with non-motorized hand tools, to water samples that can be collected from surface water bodies or existing groundwater wells and to Asbestos Survey related sampling. Provided below is a review of candidate suites of analytical parameters potentially relevant for a Phase II level of investigation.

SOIL AND SEDIMENT SAMPLE COLLECTION AND ANALYSIS REQUIREMENTS

The analyses conducted on samples collected during a Phase II should be limited to broad screening analytical methods and/or contaminants known to be on-site, particularly when large numbers of samples will be collected. The use of screening analyses will assist in the determination of waste classifications, and establish a compound of concern analytical suite for follow-up investigations, as necessary. This will minimize the analytical cost associated with a Phase II and potentially a Phase III that picks up where the Phase II left off.

The Phase II sampling plan will be developed using site-specific conditions discovered during the Phase I. If there are no known specific contaminants identified, but suspect areas or materials are present, the analyses will be limited to the following, unless directed otherwise by the District or Roadway/SEMP Section.

VOLATILE ORGANIC COMPOUNDS

Volatile organic compounds (VOCs) are suspected to be present at a site or AOC when prior uses included petroleum hydrocarbon storage (especially gasoline), dry cleaners, machine shops, and manufacturing facilities. Consideration should be given to the applicability of PADEP petroleum product short list VOCs for active and former gasoline retail facilities, and the more comprehensive PPL VOC suite should be used for current and former drycleaners.

SEMI-VOLATILE ORGANIC COMPOUNDS

Semivolatile organic compounds (SVOCs) are suspected present at a site or AOC when prior uses included or suggested petroleum hydrocarbons, especially diesel fuel, heating oil, coal ash, fly ash and creosol. Consideration should be given to the applicability of the PADEP petroleum product short list SVOCs for fueling facilities and heating oil tanks, and the more comprehensive PPL SVOC suite should be used for coal ash or fly ash situations, including Historic Fill containing ash or cinders.

HEAVY METALS

Heavy metals are a common concern in a variety of manufacturing settings, including machine shops, metal fabrication and plating facilities, and are often found in slag, cinders, and most types of ash. Lead and arsenic may contaminate soil or groundwater in orchards where certain pesticides were historically used. Lead can also be associated with historic gasoline spills.

Where landfill disposal of contaminated soil is likely, design-phase analysis of impacted soil samples for the RCRA metals list may be conducted in place of PPL metals. Metals analysis using the Target Analyte List (TAL) for Metals and Cyanide, or the use of inorganic analytical parameter lists more extensive than the RCRA or PPL metals lists, is prohibited without District written approval. In addition, please consult Roadway/SEMP Section if Synthetic Precipitation Leaching Procedure (SPLP) or Toxicity Characteristic Leaching Procedure (TCLP) are recommended as part of the analytical suite when assessing heavy metals impacts. Please refer to the Tiered Analyses section below.

PESTICIDE/PCB:

Analysis for pesticides or PCBs is only performed if Phase I records review confirms or suspects pesticide and/or PCB prior use. The focus with these constituents is primarily on soils, as neither class of constituent readily dissolves in groundwater.

TIERED ANALYSES

Evaluation of the analytical data obtained from an initial round of screening analyses may indicate the need for more specific analyses to determine how to handle the waste anticipated to be generated during the construction project. For example, the need to conduct a SPLP or TCLP analysis may be required depending on the planned disposition of anticipated waste generated for a project. Specifically, if material impacted with contaminants above applicable criteria (i.e. Management of Fill or Act 2), are planned to be re-used either within the project ROW or transported for beneficial re-use on another site, SPLP analyses may benefit confirming the material is suitable for the intended re-use. TCLP analyses are typically required by disposal facilities to confirm the waste meets the requirements of the facility. If you have any questions regarding these or other analytical approaches, please contact Roadway/SEMP Section.

> **NOTE:** Please contact Roadway/SEMP Section if the Investigator intends to utilize SPLP or TCLP analyses, in order to confirm that the approach is appropriate.

Analytical aid in determining if contaminated soil or sediment can remain undisturbed, be used as select fill material, or must be characterized and disposed of as Residual or Hazardous Waste, or whether deeper intrusive sampling is required to assess the magnitude and extent of impact relative to the transportation project feature(s). Phase I findings should always be used to focus any Phase II sample analytical suite.

SURFACE WATER AND GROUNDWATER SAMPLE COLLECTION AND ANALYSIS REQUIREMENTS

Surface water and groundwater analysis should be performed using specific contaminants of concern identified during the Phase I investigation, rather than screening parameters. The extra cost will be minimal, because the number of existing access points, for example groundwater monitoring wells, streams, lakes and surface impoundments is usually limited in number. Classes of substances like those identified above for soil and sediment should be considered for water to assure the soil-to-groundwater/surface water pathway is evaluated consistently from release point, down through the soil column/across land to groundwater/surface water, as required by planned transportation features.

Surface water should be sampled more selectively than groundwater. Surface water seldom impacts excavation dewatering with contaminants, but it can influence the rate and volume of required dewatering, so surface water is typically not sampled to determine quality. If an entire property will be acquired by PennDOT for use by PennDOT or for a transportation project where a stream is adjacent to or runs through the property and the Phase I suggests the presence of groundwater contamination, surface water sampling may help to

gauge natural resource impact and liability were PennDOT to acquire the property. In those cases, consideration should be given to assessing stream water quality hydraulically up gradient, coincident to and down gradient of the suspected release point or zone. Any surface water samples analyzed for heavy metals should be unfiltered for total metal concentration determination, as regulated by 25 PA Code Chapter 93. **Surface water sampling should be discussed thoroughly with the District and should include Roadway/SEMP Section to assure objectives and outcomes are understood.** In cases where acid mine drainage is of concern, the District Environmental Manager should coordinate investigation activities with the District Geotechnical Manager.

Groundwater sampling of existing monitoring wells can be considered if actual or probable impact to groundwater is known or suspected from the Phase I, and either PennDOT is considering purchasing the property, or project excavations may intercept potentially contaminated groundwater. However, residential wells are typically not useful for Phase II investigations, as these wells are typically deeper than planned excavations and usually will not provide representative samples of the shallow groundwater that may be encountered during excavations. Normally, residential wells are sampled only if they are operating supply wells that may have been impacted by waste sites for which PennDOT plans to assume liability following property acquisition. Residential well sampling considerations include potential PennDOT or contractor liability in the event that the residential well is damaged during sampling, the need to collect fresh water from a sampling port uninfluenced by water softening, chlorination or metals filtering/sequestration, and potential impacts from nearby septic leachfields.

Springs, typically an expression of youthful, shallow groundwater discharge, are candidates for groundwater sampling if accessible, and if sampling can be performed without interference from plumbing. Septic tanks and cisterns may be candidates for sampling if improper disposal of regulated chemicals is suspected, which may or may not be representative of surrounding or deeper groundwater quality.

Analytical suites for water samples should normally be based upon known or suspected contaminants identified in the Phase I investigation. Heavy metals analyses should be performed on both unfiltered and filtered sample portions ("splits") to evaluate total metal content and dissolved metal content, the former to aid scoping of treatment and discharge requirements for excavation dewatering, and the latter specified in Act 2 regulations.

ASBESTOS SCREENING REQUIREMENTS

The regulatory requirements for asbestos survey methods and ACM management are complex, and largely beyond the scope of this publication. Asbestos regulations concerning ACM management, asbestos worker protection, asbestos survey methodology, and asbestos worker certifications may be found in 40 CFR 61 Subpart M, 40 CFR 763 Subpart G, 40 CFR 763 Subpart E, 29 CFR 1926.1101, 29 CFR 1910 Subpart I, and PA Act 194 of 1990 (amended in PA Act 161 of 1998). For project management purposes under Publication 281, the following information relating to the Phase II asbestos survey is provided for consideration.

- ❒ Samples of suspect materials are analyzed using Polarized Light Microscopy (PLM) (EPA Method 600/R-93/116), as a bulk estimate. Samples showing analytical results of greater than 1% asbestos are considered ACM and are normally managed accordingly, without further laboratory analysis. Samples with non-detect results are not considered ACM. Samples with analytical results showing detections of 1% asbestos or less, including "trace" results, are considered ACM by default, unless a result of 1% or less is obtained from reanalysis using the more precise PLM Point-Count or TEM methods. On occasion, when PLM bulk estimate results only slightly exceed 1% asbestos, the District may wish to reanalyze samples using PLM Point-Count analysis. Some examples of situations in which the more expensive PLM Point-Count reanalysis may be desirable:

- ❒ Significant cost avoidance is possible because potential ACM is present in large quantities, or is present in a location that would be expensive or difficult to abate.

- ❒ Structure demolition would be simplified if it can be shown that ACM is not present.

- ❒ Reporting to the regulatory agencies can be avoided if certain types of materials can be shown not to be regulated as ACM.

Non-friable Organically Bound (NOB) asbestos-containing materials contain an opaque organic binder that may interfere with PLM analysis. For laboratory analysis, it is strongly recommended that PLM analysis of suspect NOB ACM should be preceded by sample preparation using procedures specified in New York State Department of Health Item 198.6, Sections 4.1 through 4.4, colloquially known as "PLM NOB." Rebuttal of PLM NOB detections to demonstrate an asbestos content of less than or equal to 1%, if desired, requires re-analysis using TEM rather than PLM Point-Count NOB.

Commonly encountered NOB suspect materials include asphaltic roofing materials, vinyl floor tiles, and bituminous joint spacers, crack sealers, and utility wraps, especially those manufactured before 1980.

UST INVESTIGATION REQUIREMENTS

Phase II UST associated investigations generally involve the following site assessment efforts:

- ❒ Verification of the number and/or location of USTs via surface geophysical surveys
- ❒ Collection of water samples, if applicable (see Evaluation of Data considerations)
- ❒ Collection of surface soil samples (principally for stains around ASTs)
- ❒ Additional site background information record reviews, follow-up interviews, or other site history data search tasks not completed during the Phase I

It may be possible to verify the location of tanks during the Phase I waste site investigation, without conducting any field investigations. However, when tanks are suspected and the tank location cannot be found or verified during the Phase I, this task must be included in the scope of work for the Phase II and is typically the primary rationale for conducting the Phase II.

The primary uses of geophysical investigative methods during a Phase II include:

- ❒ Locating and delineating USTs and ancillary piping in the vicinity of the existing and proposed ROW boundaries (as a secondary task, geophysical methods may also be used to locate improperly abandoned monitoring wells during this investigation)
- ❒ Locating and delineating pipelines
- ❒ Locating and delineating reported or known drum disposal areas

When PennDOT participates in brownfields redevelopment projects, it is important to perform a geophysical investigation in the footprint of planned excavations in the interior of old industrial sites, due to the risk of encountering undocumented facilities such as fuel lines, wastewater lines, waste treatment units, oil-water separators, USTs, buried waste, buried AST holders, and other potentially hazardous structures.

Typically, the most frequently used method for metallic tank and associated appurtenances locating is ground penetrating radar (GPR) and deep sensing electromagnetic detectors or EM techniques. GPR is best in coarser soils, such as backfill around UST systems, as apposed to wet clays, which can attenuate the radar signal. Each technology produces contrasts in earth materials and metallic objects and generate either vertical (GPR) or horizontal (EM) profiles. EM techniques are sensitive to surface interference features like cars and sign posts and to shallow metal rebar in concrete. However, when interference is minimal or absent, metal detectors may be adequate for locating USTs.

The particular geophysical method to use should be made on a case-by-case basis, and should consider the site conditions, instrument sensitivity and effectiveness. PennDOT has found through experience that surveys incorporating both EM and GPR technologies provide the surest means to detect buried metal objects, cost effectively. **Results of geophysical surveys that are negative, providing no evidence of UST system or buried metals components, are not a certification that UST systems or buried metal are not present at a site.** As steel rusts in the subsurface, especially tanks installed decades ago in clay rich soils and which were backfilled with those soils, the electrical/magnetic contrast with soils decreases to the point of a diffuse metal signature to complete absence of metal signature. Geophysical surveys are another line of evidence that must be evaluated properly to reach valid conclusions and recommendations for further action.

Active UST system monitoring wells completed to the base of tanks in the tank field backfill can provide evidence of hydrocarbon impact, with more conclusive determination of a shallow surface spill versus a tank leak at depth difficult. The porous backfill used in most active tank fields tends to perch water within the confines of the tank field, often times resulting in shallower than actual groundwater levels, or the appearance of a groundwater mound.

The standard chemical analytical parameters for fuel contaminated soil and groundwater should be conducted and reported as outlined in the most current ***DEP Closure Requirements for Underground Storage Tank Systems: Analytical Requirements.*** In instances where soil samples are collected at a suspected leaded gasoline release site, petroleum compound analysis shall not include heavy metals other than lead, unless a release of other heavy metals is suspected.

The DEP Closure Requirements for UST Systems, April 1, 1998, reflects a change in analytical requirements for tank closures. Previously, PADEP utilized a Petroleum Hydrocarbons (PHC) analysis, along with the BTEX analysis, to determine the presence of contaminated media from a tank release. However, the Land Recycling and Environmental Remediation Standards Act (Act 2) established cleanup standards statewide, for specific compounds. Because PHC analysis does not provide compound-specific analytical results that can be compared to Act 2 standards, and because PHC analysis does not distinguish between naturally occurring hydrocarbon compounds and those resulting from a fuel release, PHC analysis is **no longer** a recommended tool for screening analysis. Existing PHC data may still be included in the Phase I or II review of UST data, but it has been PennDOT's experience that such data is not a reliable indication of whether soil or groundwater contaminants exceed Act 2 standards.

Contaminated groundwater for which PennDOT has no cleanup liability generally will require that no further actions are necessary, if the highway construction does not intersect the groundwater table, or groundwater impact is lingering from a PADEP approved Act 32/2 cleanup. The Investigator and District must consider the highway design, for example cut and fill areas, drainage controls and footer depths in order to assess potential groundwater contamination impacts from the tanks.

Where a contaminated groundwater plume is determined to exist within excavation areas, worker health and safety, water treatment, and disposal of contaminated groundwater from dewatering operations must be properly evaluated. When there is a reasonable suspicion that groundwater may be intercepted by construction activities near UST locations, an assessment of groundwater contamination **must be conducted**. In many cases where construction activities will be performed adjacent to 3rd party UST corrective actions, the third party remediator groundwater monitoring data, if available, may be sufficient to provide the necessary groundwater characterization data.

If documented groundwater contamination exists and construction activities will not intercept the water table, a groundwater investigation is not necessary. The District can simply develop Special Provisions to handle the treatment and disposal of contaminated waters from dewatering operations.

As an alternative to the offsite disposal of untreated contaminated water, it is often possible to find a convenient discharge point for the water, following proper treatment and testing. In some cases the local water authority may grant permission to discharge into the sanitary sewer system. For small volumes of treated water, a temporary discharge authorization from PADEP may be obtained for the discharge of treated water onto the ground surface, provided that the request to PADEP specifies the proper erosion and sediment (E&S) control measures to be taken. With larger volumes, a storm sewer or stormwater drainage system may be used for the discharge point. Storm sewer or other controlled discharges with duration less than 6 months require a temporary discharge authorization from PADEP, and require the best available treatment at the point of discharge. Discharges with duration longer than 6 months require a full National Pollutant Discharge Elimination System (NPDES) permit.

An assessment of the groundwater flow direction and/or the aerial extent of the contaminant plume are generally recommended where the source of the contamination is outside of the right-of-way, and the geologic/topographic conditions of the site indicate the potential for migration of the contaminant plume into the proposed right-of-way. This will require the scoping of a Phase III.

LABORATORY ACCREDITATION

Environmental samples are to be submitted for analysis at laboratories that are currently accredited as follows:

- ❒ Asbestos analysis – National Voluntary Laboratory Accreditation Program (NVLAP) accreditation through the National Institute of Standards and Technology (NIST), in accordance with Paragraph (k)(5)(ii)(B) of 29 CFR 1926.1101.
- ❒ Solids and liquids – PADEP accreditation, in accordance with the PA Environmental Laboratory Accreditation Act of 2002 (Act 90 of 2002), Part 2.

ASSESSMENT

INFORMATION COMPILATION

The Investigator gathers and organizes all existing information obtained during the Phase II investigation. All original data, in addition to any supplemental information gathered, should be made part of the project's technical files, and ultimately becomes the property of the Department. Additional information obtained via records review should be summarized and amplify Phase I records. Pertinent elements of records should be added to appendices. The environmental site/AOC risk matrix should be updated/refined with new findings, including the re-ranking of sites/AOCs if new information amplifies or improves associated risk. Environmental sample analytical results should be tabled by media and property/AOC and compared to applicable standards. Water level maps should be prepared or third party maps identified and corroborated for use. The site sketch(es) should be improved with new findings.

Information Evaluation

The Investigator studies the compiled data, and evaluates the impact of the known environmental conditions on the highway project.

Should the Investigator or the District determine that additional reasonably attainable data records review, site reconnaissance or interviews are needed in order to complete the evaluation of data (no change in scope of work), then every reasonable effort should be made to obtain the information to support the Phase II conclusions.

If tank locations have been verified through the use of records instead of field tank locating techniques, the information should be compared to the available site reconnaissance information to ensure the accuracy of tank locations.

If the additional records cannot be obtained or are inconclusive, then the Investigator and District should discuss and determine whether to proceed with the other Phase II UST tasks.

After tank locations have been confirmed, the Investigator should evaluate the need for assessing the extent of contamination, if any. Information that should be considered to determine this need includes, but is not limited to:

- ❒ Past compliance history; indications of proper tank closure (e.g. product removed, tank filled with inert substance), leak detection monitoring reports, tank product inventories, etc.)
- ❒ Proximity of tank(s) to proposed right-of-way; are tanks located up gradient or down gradient, with respect to likely contaminant migration direction, to the proposed right-of-way.
- ❒ Is groundwater impacted and will construction dewatering occur? This consideration follows the prior bullet, and must be investigated to address health and safety exposure as well as water handling during construction.
- ❒ Is this a complete or partial property acquisition? If a partial acquisition, are the tanks located within the proposed right-of-way? If the tanks are not located on required property acquisition, no further investigations will be necessary as PennDOT will not take ownership of the tanks. (Refer to Proximity of Tanks above, before making this determination.)

Once tanks have been located, the site sketch should be improved with the Phase II derived location information.

RECOMMENDATIONS

The Investigator develops one of the four following recommendations for further action at sites where environmental conditions of concern were further noted or defined during the Phase II:

- ❒ ***No further action required.***

  Can be on a site-by-site, or AOC basis. In this case, data indicated there is **no significant impact** to the highway project.

- ❒ ***No further action required*** at this time (Specify sites/AOCs, actions and times) In this case, data indicates **minor, easily handled or questionable amounts of contamination.** If there are minor or easily handled amounts of contamination, it may be addressed by a special provision in the PS&E package (Final Design). If there is questionable contamination, no action should be taken until the focus of the project has been refined, and/or appropriate action (if any) is determined by the District (or Roadway/SEMP Section).

- ❒ ***Initiate Phase III activities*** (Identify specific concern(s), reason(s) for concern, and specific steps needed to adequately address the concern(s))

  Under these circumstances, data indicates an obvious or strong likelihood of **significant materials contamination (hazardous or nonhazardous).**

- ❒ ***Initiate immediate action*** (Specify site/AOC, actions). In this case, serious contamination is present on, or migrating toward, Commonwealth-owned or leased property which will likely result in the substantive detriment to life, the environment or property if immediate action is not taken. ***In such cases, the Investigator should coordinate with the District and Roadway/SEMP Section as soon as possible.***

NOTE: District must receive Roadway/SEMP Section concurrence on any recommended Phase III activities.

5.2.4 NESHAP POLICY FOR BRIDGE DEMOLITION & RENOVATION

PennDOT employs a systematic approach for compliance with the asbestos inspection and notification requirements of the National Emissions Standards for Hazardous Air Pollutants (NESHAP) Act.

5.2.4.1 INSPECTION PROCEDURE

Based on historical asbestos inspections of bridges and a review of standard bridge design specifications, it has been shown that bridges that do not have attached utilities or span railroads, do not possess asbestos-containing materials (ACM), or they contain ACM below regulatory thresholds. As such, the Asset Management Division utilizes the Bridge Management System (BMS) database to identify bridges that do and do not have attached utilities or span railroads, and to consider the findings of asbestos bridge inspections. Bridges are categorized as follows:

List A: Bridges determined, either from BMS data or through certified inspection, not to exceed NESHAP threshold quantities of regulated ACM (260 linear feet or 160 square feet).

List B: Bridges with a potential to contain regulated ACM exceeding NESHAP threshold quantities, but for which no asbestos inspection has been conducted. Bridges on this list are required to have an asbestos inspection conducted by an accredited inspector. Bridges are placed on List B by meeting one of the following criteria:

- ❒ The bridge spans an existing or former railroad.
- ❒ One or more utilities are attached to the bridge, such that bridge renovation or replacement may disturb or damage the utility line(s).

- ❒ Bridge span length totals at least ¼ mile, and caulking is present in metal railing attachments.

List C: Bridges determined to have regulated ACM exceeding NESHAP threshold quantities, above which additional air emissions control requirements are applicable.

Guidance for entering ACM information into BMS may be found in Publication 100A, the Bridge Management System 2 (BMS2) Coding Manual. Further, the Waste Management Guidance Manual (Publication 611), Volume 1, Section 3.6 provides ACM inspection, classification, abatement and disposal guidelines.

For bridges placed on List B due to the presence of utilities, the District should attempt to have the utility owner conduct the inspection and provide the inspection report to PennDOT. If the District is unsuccessful in getting the utility owner to conduct the inspection, then PennDOT must conduct the inspection.

5.2.4.2 NOTIFICATION PROCEDURE

The regulatory agencies have agreed to allow PennDOT to make an Annual Consolidated Notification for all bridge demolition and renovation projects scheduled for letting the upcoming calendar year. The notification list also includes ongoing bridge demolition and renovation projects that will continue into the upcoming calendar year.

This annual notification will be made the third week of December. Roadway/SEMP Section will post a Crystal Report to the regulatory agencies that lists all Bridge Projects to be let in the next calendar year, whether they do or do not contain ACM, as well as the planned let date. A separate list is posted for Allegheny County bridge projects. The intent is to inspect List B and "unknown" status bridges and move them to either List A or List C (as appropriate) prior to annual notification. This process constitutes PennDOT's Annual Consolidated Notification to meet the notification requirements of the NESHAP Asbestos regulations.

Individual NESHAP asbestos inspections and EPA notifications are required for all bridges entering Construction phase in the current calendar year that were not included on the Annual Consolidated Notification for the current calendar year. This includes List A bridges as well as List B and "unknown" status bridges.

If the let date or scope indicated for the bridge project should change from the date found on the web site, or a new bridge project is added, the District shall notify the applicable regulatory agencies, via phone or fax, and follow-up with submittal of the notification form, in accordance with the regulatory requirements, as indicated in PennDOT's June 8, 2006 letter to the Environmental Protection Agency (EPA). The re-notification may be incorporated into the project contract documents.

This policy is effective for all bridge demolition and renovation projects. This policy is not applicable to Bridge Preservation Program projects, based on an evaluation of the eligible work items under the program. Bridge deck replacements are considered renovation, however, and are subject to the requirements of this Asbestos Policy.

Asbestos inspection reports are typically prepared and submitted separately from other Environmental Site Assessment reports. Care should be taken to include NESHAP ACM category determinations in the inspection results tables as appropriate, i.e. friable, Category I non-friable, and Category II non-friable. **Roadway/SEMP Section staff may be contacted for further information at 717-787-6899.**

5.3 PHASE III WASTE SITE INVESTIGATION PROCEDURES

The Phase III is an intrusive investigation of soil and potentially groundwater to confirm the release of regulated substances when laboratory confirmation of the release is required and Phase I and II information cannot make that confirmation adequately. The Phase III is intended to detail specific waste-related concerns, both hazardous and nonhazardous, identified in previous Phase I, II, or III investigations.

NOTE: Phase III investigations may facilitate or require additional/further Phase III Investigations.

Due to the wide variety of inquiries possible, the Phase III scope of work is determined on a **case-by-case** basis. Since this investigation is typically invasive and detailed, a significant level of effort will be required. Thus, careful **planning is strategic** to avoiding unnecessary studies, efforts, time delays, and expenses.

A Phase III is **initiated** by the District, and requires **review and approval** by Roadway/SEMP Section. Often, there will need to be coordination between the Department and other interested parties (i.e., PADEP, US EPA, local officials, contractors, consultant professionals, NEPA Process member organizations, etc.). In some cases, it may be beneficial to bring all interested parties together at the onset of a Phase III to provide the opportunity for input into the process.

5.3.1 APPLICABILITY

A Phase III is intended to answer specific waste-related questions raised as a result of a Phase I, Phase II, or an earlier Phase III assessment. A Phase III may occur as early as **Preliminary Design in the TPDP**, or as late as **Final Design**. The timing and scope are to be determined solely by the needs of the TPDP. Since a Phase III should only be conducted to address specific concerns, it is normally performed (when needed) in Final Design after the necessary project planning details have been addressed. This encourages a narrow focus on specific problems, yielding cost and time minimization through:

- ❒ Scope of work reduction
- ❒ Duplication of effort elimination
- ❒ In-house expertise utilization

There are, however, circumstances when a Phase III may be warranted earlier. Some of these include:

- ❒ Alignment design considerations
- ❒ Health and safety issues related to other invasive activities (e.g., archeological excavations, geotechnical investigations, excavations, etc.)
- ❒ ROW acquisition issues
- ❒ Cost analyses, including feasibility studies

A Phase III may only be undertaken when indicated as necessary by a previous waste site investigation (Phase I, II, or III). A Phase III is usually initiated by the District; however, it may also be required in order to receive concurrence from other interested parties. Finally, the District must consult with and receive approval from Roadway/SEMP Section prior to beginning any Phase III activities.

It is strongly recommended that regulated UST sites undergo a Phase II and possibly a Phase III investigation prior to property acquisition, if the property is not currently under investigation by a third party. Identifying the locations of all USTs in a Phase II geophysical survey will enable the District to eliminate the risk of rupturing USTs while drilling geotechnical borings or excavating soil. If USTs are found, the next step depends upon District preference and the acceptable level of risk. A Phase III investigation can use geophysical survey data to target soil boring locations, with UST and contaminated soil removal occurring during Construction phase. Alternatively, the District may remove USTs and any contaminated soil during Design phase, in order to reduce remediation costs and eliminate potential Construction-phase project delay.

After property acquisition, if a regulated UST within the property is discovered to have caused a release, PennDOT must follow the corrective action process (CAP) requirements in the Act 32 regulations. In this situation, PennDOT will usually be unable to meet the site characterization reporting deadline of 180 days following petroleum release discovery. In order to avoid regulatory noncompliance, therefore, within 180 days of discovery, it is strongly recommended that PennDOT propose to PADEP an alternative timeframe for completion of the Phase III, as allowed in 25 PA Code 245.310.

5.3.2 PARTICIPANTS AND RESPONSIBILITIES

ENGINEERING DISTRICT

The District is typically the overall administrator and director of a Phase III. In those circumstances when the District feels it cannot adequately direct the Investigator, the District may request the assistance of Roadway/SEMP Section. The District, jointly with Roadway/SEMP Section and the Investigator, develop the scope of work and both District and Roadway/SEMP Section must approve the scope of work. The District and Roadway/SEMP Section review and comment on the draft final report and must both approve the final report.

CENTRAL OFFICE

For the purpose of a Phase III, Central Office will be represented by the appropriate staff in Roadway/SEMP Section in Central Office will provide a technical expert to assist with scope of work development, implementation oversight and review and approval of the report. Roadway/SEMP Section is the Department's chief technical expert in the area of waste investigations. Roadway/SEMP Section is the **primary authority** related to technical content/evaluations concerning Phase IIIs. Roadway/SEMP Section concurrence is required for the acceptance of the scope of work and the final report.

INVESTIGATOR

> **NOTE:** A Phase III needs to be completed before submission of the PS&E package, otherwise these issues will not be included in the contract and would likely result in changed conditions claims. Therefore, the Phase III should be completed before the Waste Management Plan.

The Investigator is the entity that performs and is responsible for performing the environmental investigation/assessment, and produces the Phase III report. The Investigator may include Consultant, District, or Roadway/SEMP Section personnel, who possess sufficient training, experience, credentials, ability, and equipment necessary to conduct the field investigations and assessment, and produce the final report required for a Phase III. In most cases, the Investigator will be a Consultant. Typically, the Investigator is directed by the District; however, in special cases, the Investigator may be directed by Roadway/SEMP Section, or a combination thereof.

5.3.3 SCOPE AND PERFORMANCE

A Phase III consists of the following components:

1. **Initiation**
2. **Waste Investigation Plan (WIP)**
    a. Investigation Background and Rationale
    b. Health and Safety Plan
    c. Field Sampling Plan
    d. Quality Assurance Plan
    e. Investigation Derived Waste (IDW) Management Plan
    f. Schedule
    g. WIP Submittal and Review
3. **Fieldwork**
    a. Intent to Enter and other site access arrangements
    b. PA One-Call
    c. Sample Collection and Analysis

2. Assessment

a. Information Compilation

b. Information Evaluation

c. Recommendations

3. Reporting

a. Draft Report

b. Final Report

Initiation, WIP development, fieldwork and assessment are reviewed below, with reporting discussed in Section 6.0.

5.3.3.1 INITIATION

The District informs Roadway/SEMP Section of its desire to perform a Phase III and routes all relevant completed waste investigations to Roadway/SEMP Section for review. The District and Roadway/SEMP Section informally meet to review the existing project data and the recommendations.

Due to the focused nature of a Phase III, the District, in consultation with Roadway/SEMP Section, should carefully consider and identify specific current and future needs that must be addressed by this work. The District and Designer, if a transportation project, should make these needs clear to the Investigator prior to the development of the draft scope of work. Both the District and Roadway/SEMP Section should ensure that the final scope of work is adequate before granting acceptance.

The District chooses a qualified Investigator. Based upon the Department's needs, a formal scope of work meeting may or may not be required; however, such a meeting is encouraged. The scope of work meeting is meant to function as a planning session for all participants in the Phase III, including District, Roadway/SEMP Section and Designer. Minimally, the scope of work meeting should define the Department's and Designer's needs and expectations to the Investigator, and a general outline of the service(s) the Investigator proposes to provide to the Department in order to meet the needs and expectations.

At the onset of the effort, a scoping field view, including the District, Roadway/SEMP Section, and Investigator along with any other pertinent personnel, is recommended to further focus the needs to be addressed by the scope of work.

NOTE: It may be beneficial to hold the Scoping Field View during the Initiation Phase to help determine the scope of work.

The Investigator, in cooperation with the District and Roadway/SEMP Section, develops a draft scope of work based upon:

- ❒ The specific recommendations of the Phase I, II or III Assessment
- ❒ Generally accepted waste site investigation procedures
- ❒ Roadway/SEMP Section recommendations
- ❒ TPDP needs, as interpreted by the Department

NOTE: Because Phase I or II reports containing recommendations for Phase III waste site investigations must be reviewed by Roadway/SEMP Section, this step normally takes place during the Phase I or II review process

- ❒ Sample location(s)
- ❒ Access requirements (if any)
- ❒ Field monitoring (if necessary)
- ❒ Analytical requirements
- ❒ Quality assurance procedures
- ❒ Decontamination, waste disposal and boring/well abandonment
- ❒ Report documentation

5.3.3.2 WASTE INVESTIGATION PLAN DEVELOPMENT

One of the primary objectives of the WIP is to identify the scope of the planned investigation. The WIP should incorporate flexibility to incorporate field screening results to help further guide sampling locations under a given mobilization. The WIP can be designed and implemented for a single site or multiple sites and single or multiple phases, with subsequent phases contingent and scoped from prior phases.

- ❒ Background and rationale for Phase III
- ❒ Type(s) of sampling
- ❒ Proposed sampling method(s)
- ❒ Sample location(s)
- ❒ Access requirements (if any)
- ❒ Field monitoring (if necessary)
- ❒ Analytical requirements
- ❒ Quality assurance procedures
- ❒ Decontamination, waste disposal and boring/well abandonment
- ❒ Report documentation

INVESTIGATION BACKGROUND AND RATIONALE

The WIP should provide pertinent background information and findings from prior Phase I and II waste site investigations, as applicable, to support the stated rationale for conducting the Phase III at the subject AOCs/sites. Time between Phase I/II and Phase III investigations can span several years for large, complex property acquisition and transportation projects, so it is essential that the WIP carries forward Phase I/II findings and recommendations to support why the Phase III is focusing intrusive investigation at the chosen locations.

Because assessing waste potential can be completed to a large extent at the Phase I/II level of investigation, it is critical to understand and communicate why intrusive sampling is necessary. Essential to rationale demonstration is knowledge of the near final transportation project design and the scale of associated earthwork required to construct the project. It is not enough for an Investigator to simply list the AOCs/sites of concern to be investigated. The Investigator should identify why these AOCs/sites of concern are important to the project relative to waste generation potential or, in some cases, relative to final design. Phase III findings can materially impact project design, for example guiding decisions regarding:

- ❒ Location, depth and design of utility installation
- ❒ Location and design of stormwater BMPs
- ❒ Impacted soil reuse through strategic embankment and passive wasting

HEALTH AND SAFETY PLAN

The HASP should meet the requirements promulgated in 29 CFR 1910.120, as detailed in Section 3.0 herein. The HASP development in the scope of work typically is **not** incidental to a Phase III. The HASP is typically a stand alone document to the WIP and does not require review by PennDOT. Individuals taking part in Phase III fieldwork must meet the training and certification requirements established by OSHA. These individuals are to be familiar with all aspects of **the site-specific HASP.**

FIELD SAMPLING PLAN.

A biased sampling approach is almost always preferred to assure detection of a release or spill. Resultant data can be compared to Act 2 and MoFP criteria to make an assessment of concern and potential for waste generation without necessarily meeting exact procedural requirements of a given regulatory program since PennDOT is not scoping remediation or managing waste yet at this juncture of the project. The goal at this stage of assessment is identification of a release and its component regulated substances in excess of Act 2 and MoFP criteria over chasing the limits of impact to nondetect. This level of data is useful to scope waste potential and evaluate a remedial obligation without excess sampling and analysis.

Reference to a field sampling plan means the section of the WIP that defines the scope of sampling; the numbers and locations of soils borings, contingencies to collect undeveloped, grab groundwater samples, monitoring well installation, sampling and testing, permeability testing and the like, per the Design and its associated earthwork impact. The field sampling plan should identify all the media and areas of interest to be sampled and tested to assess waste, including:

- ❒ Soil and sediment
- ❒ Surface water
- ❒ Groundwater
- ❒ UST requirements
- ❒ Water level monitoring
- ❒ Groundwater permeability testing
- ❒ Stormwater BMP locations
- ❒ Soil vapor sampling (only with Roadway/SEMP Section agreement)

Selection of analytical parameter suites at this stage should typically be very focused based on Phase I/II information like past site use, specific spill histories, Phase II UST location data and inferences and the like. PADEP short lists for motor fuels, both leaded and unleaded gasoline, may be adequate at active and former gasoline service stations. Use of the broader PPL VOC and SVOC suites, or PCBs, herbicides and pesticides are typically driven by specific past site uses, like drycleaners, manufacturing facilities and agricultural facilities, or conversely when a broad screening is needed in an initial phase to develop a more focused target list of constituents of concern for subsequent phase(s).

Metals analysis using the Target Analyte List (TAL) for Metals and Cyanide, or the use of an inorganics analytical parameters list expanded beyond the RCRA or PPL suites, is prohibited without written District approval. Phase III reports or lab reports that follow from a failure to meet this requirement may be rejected by the District or Central Office, at PennDOT's discretion. In effect, analytical results do not exist until the Phase III or laboratory report is accepted by PennDOT. For groundwater sample analysis for heavy metals, PennDOT advocates collection of filtered and unfiltered samples to determine the dissolved metals content versus the total metal content attributed to water, sediment and metal colloids. Act 2 regulates dissolved constituents, whereas Chapter 93 water quality standards regulate total concentrations of constituents in surface water.

UST release investigation requirements vary for active/regulated versus abandoned/unregulated tanks. Release detection at active systems typically is only considered if PennDOT will encroach on the system or take the entire site and prior third party investigation has not occurred. Release detection and integrity test

information, inventory records and possibly Phase II tank field well sampling should be reviewed to determine the need to intrusively investigate active systems that PennDOT will end up acquiring and closing prior to or during construction. In most cases, active systems with no prior knowledge or Phase II confirmation of a release can forego investigation and rely on a contract Special Provision to guide the Contractor in bidding and closing the storage tank. Section 7.0 provides further guidance on the development and use of Special Provisions. Alternatively, a District can use the statewide Environmental Remediation Services contract to close out UST systems and effect soil remediation prior to project construction.

Where active tank system sites are involved in on-going third party investigation and remediation in accordance with Act 32 and PADEP coordination, available data should have been reviewed during the Phase I or as a more in-depth Phase II task to determine if the investigation is sufficient to scope soil and groundwater waste issues, or whether "gaps" exist in the third party investigation relative to the planned transportation project location and earth disturbance that warrant PennDOT investigation. Existing data will likely be adequate to scope waste impact and plan mitigation measures.

Historical tank closures approved by PADEP can still leave impact behind, as detailed in Section 4.0, especially if closed when Total Petroleum Hydrocarbons (TPH), Gasoline Range Organics (GRO) and Diesel Range Organics (DRO) were commonly used to characterize soils. Where abandoned/unregulated tanks are confirmed or suspected from a Phase I record and/or Phase II geophysical survey, it is usually useful to confirm: 1) the actual presence of the tank system, and 2) release potential to soil and groundwater, if relevant. If the site is no longer in use, test pits may be a better means to confirm the presence of a tank versus a soil boring. In contrast, soil borings along the sides and ends of tanks and at piping changes in direction inferred from geophysical surveys are a better means to attempt to detect releases, since released product and contaminants dissolved in infiltrating precipitation tend to migrate vertically downward, spreading laterally only when the water table or less so the top of a clay layer or bedrock is reached.

Soil sample collection should target estimated tank invert and bottom depths, changes in inferred piping runs and former dispenser islands, using field screening to further guide final sample collection depth. Field screening should also be used to "step-out" and follow the direction of impact migration, if significant, to better quantify the volume or mass of impacted soil and/or groundwater, especially if groundwater is shallow and inferred to flow in the direction of the transportation project where excavation dewatering could be complicated with contamination. **If an abandoned tank system is suspected, but will not be encroached by the transportation project or otherwise acquired by PennDOT, it does not require investigation.**

Groundwater can be screened during soil sampling through the use of temporary well points and hand bailers, peristaltic pumps, hand pumps or other appropriate means. These can be sufficient to gauge impact and scope waste issues and mitigation, or can be used to locate constructed monitoring wells to better assess impact, groundwater depth and flow direction and perform permeability slug tests and pumping tests.

Property acquisition for stormwater BMP installation and operation post construction almost always requires soil and groundwater investigation during a Phase III, including water level monitoring, seasonal high water table determination and in some cases permeability testing. Phase III groundwater permeability testing should be done in coordination with any separate geotechnical investigation of soil permeability, soil mottling for high water table determination and soil description study typically completed in early final design. Soil excavation, soil infiltration, contaminant leaching and groundwater mounding are critical to successful BMP siting, design and operation. Total concentrations of constituents in soil in the zone of excavation and infiltration are essential and leachable levels of contaminants in the zone of infiltration, determined via the Synthetic Precipitation Leaching Procedure (SPLP), can have utility, pursuant to the PADEP E&S Manual.

Soil vapor testing may only be relevant at PennDOT facilities where Publication 281 is also applicable guidance when the facility is planned for divestment. Introduction of a new utility during a transportation project should be evaluated relative to vapor intrusion to associated maintenance worker confined spaces and potential preferential vapor migration along the utility corridor for impact to nearby dwellings.

Situations where an entire site has been acquired by PennDOT prior to intrusive investigation, the Phase III maybe required to scope a remedial obligation. In this situation, the District and Roadway/SEMP Section should closely collaborate with the Investigator on the scope of investigation and the need to engage PADEP, Acts 32 and 2 and other regulations, as applicable.

QUALITY ASSURANCE PLAN

The decision to implement a Phase III represents increased investment by PennDOT. To best assure this investment is a good value, data integrity and usability must be assured. PennDOT requires using SW-846 to scope quality assurance measures to assure investigation integrity and therefore sample data integrity. The following quality assurance (QA) measures must be incorporated into the Phase III for implementation in the field, laboratory and office:

- ❒ Dedicated sampling equipment, where ever feasible and cost effective
- ❒ Sample method standard operating procedures
- ❒ USEPA equipment decontamination procedures
- ❒ Quality assurance sample blanks according to SW-846 type and frequency , including, duplicate sample, field rinsate blank, trip blank and laboratory method blank
- ❒ Sample chain-of-custody
- ❒ Laboratory data review and release
- ❒ Laboratory data quality assurance review and usability certification

The quality assurance section of the WIP must identify the applicable QA measures to be implemented during the Phase III data acquisition, reduction and analysis phases.

IDW PLAN AND BORING ABANDONMENT

The process of intrusive investigation through impacted media will generate investigation derived waste (IDW), which in most cases must be characterized and in all cases disposed of as a component task of the Phase III. The cost to characterize and dispose of IDW must be factored into the cost of the investigation. In some cases the analytical data developed from investigation samples and "Generator Knowledge" can be used to dispose of direct push, auger and rock cuttings. The Phase III WIP should identify the waste disposal facility and/or waste broker the Investigator will use to dispose of investigation waste and any specific waste disposal analytical parameters required by the treatment/disposal facility. The WIP must identify how and where the soil and groundwater waste will be temporarily stored, labelled, secondarily contained and then disposed of. The Investigator must coordinate with the District on where to stage the IDW until disposal. IDW disposal in Construction shall be conducted in accordance with Publication 611, Volume 1, and all applicable laws and regulations.

Any intrusive soil boring or temporary well requires abandonment or conversion to a constructed, protected and secured well by the end of the Phase III. Soil borings should be backfilled with tamped cuttings and/or bentonite chips hydrated above groundwater. The surface should be returned to the surrounding grade and material, which may require rough and finish grading of wheel ruts, seeding and mulching. Monitoring wells must be abandoned at completion of the data acquisition phase of the Phase III, or left to be abandoned under contract by the Contractor. Monitoring wells should be abandoned with coarse aggregate in the screened portion of the well and Portland cement or bentonite chips, hydrated above groundwater, from top of sand to grade, with removal of any protective stickup or flush mount cover.

SCHEDULE

The timeframe for completion of the Phase III is dependent upon each individual project and the circumstances surrounding the site. A project schedule should be developed for the overall transportation project that includes a timeframe for completing waste investigations, IDW disposal and soil boring/monitoring well abandonment. The District, Investigator and other stakeholders involved in project development should be aware of the overall project schedule and provide every effort to meet those agreed-upon dates.

NOTE: Dependent upon the project schedule, the District may determine it to be beneficial to have a concurrent review of the scope of work with SEMP Office.

Site investigation requirements must often be considered well in advance of the initiation of construction activities, due to possible conflicts with the construction schedule. When four quarters of groundwater monitoring data are needed in locations planned for roadway or sidewalk construction, monitoring wells should be installed at least one year ahead of field construction. Similarly, advance planning is important for soil gas sampling, because PADEP only allows soil gas samples to be collected during the winter or spring months.

DRAFT AND FINAL WIP SUBMITTAL

The Investigator submits the draft WIP to the District for review. The District will forward the draft WIP to Roadway/SEMP Section for review and comment. Comments/recommendations received from the District and Roadway/SEMP Section are then incorporated by the Investigator into the final WIP.

The Investigator then submits the final WIP to the District and Roadway/SEMP Section for review. Only when the final WIP has received acceptance from both the District and Roadway/SEMP Section, will a Notice to Proceed be issued by the District authorizing the Investigator to begin work according to the WIP.

5.3.3.3 FIELDWORK

The Investigator shall make every reasonable attempt to satisfy the needs addressed by the scope of work, and to do so within the financial and time constraints agreed to. Work shall be conducted promptly, and always in such a manner so as to minimize expense and inconvenience to the Department. The Investigator shall conduct themselves at all times in a professional manner consistent with the generally accepted industry standards for waste site investigations. When the Investigator is to conduct field work at a Maintenance facility, the Investigator shall provide the facility manager with at least 48 hours advance notice of the planned site activities.

When offsite property access is required, the District is strongly urged to request access as soon as possible. If the property owner requires execution of an Access Agreement instead of an Intent to Enter Letter, obtaining access may take two to four months (largely due to the Commonwealth's signature process for the Agreement), or even longer depending on the length of negotiations with the property owner. It is also recommended that the owner/renter be contacted at least 48 hours prior to the initiation of work and upon arrival at the site.

INTENT TO ENTER

The District must provide copies of Intent to Enter letters to the Investigator prior to the commencement of any fieldwork that requires access to private property. No individual in the employ of the Department may enter private property for the purpose of performing Phase III work unless Intent to Enter letters have been served. As stated previously, when offsite access is required, the District is strongly urged to request access as soon as possible. If the property owner requires execution of an Access Agreement instead of an Intent to Enter Letter, then obtaining access may take 2 to 4 months, or even longer depending on the length of negotiations with the property owner.

PA ONE-CALL

The Investigator is responsible for complying with Act 287 and contacting Pennsylvania One-Call for utility locations prior to any invasive activity. PA One-Call requires more than 3 days but less than 10 working days notification prior to the beginning of any subsurface exploration work. It is recommended that PA One-Call be notified as early as possible to allow for responses and marking of utilities in the field.

SAMPLE COLLECTION AND ANALYSIS

The Investigator collects and analyzes samples as per the Field Sampling Plan in the WIP. Groundwater investigation costs can often be reduced through the use of direct push well points (such as Geoprobe®)

instead of installing conventional monitoring wells. However, the Investigator should bear in mind that increased turbidity associated with well points may elevate measured concentrations of non-VOC compounds, particularly heavy metals, PCBs, pesticides, and heavier semi-volatiles.

Where there is the potential for large volumes of contaminated groundwater to be pumped out of excavations, e.g. from dewatering long-duration excavations along a stream, a monitoring well slug test is recommended, so that the District planners and construction contractors can estimate the volume of dewatering fluids that will require treatment or disposal. For larger transportation projects, stepped-flow rate and longer term constant flow rate pumping tests may be required to better evaluation groundwater recovery well performance, magnitude of dewatering and pre-treatment requirements.

The Investigator is responsible for:

- ❒ Procuring all necessary equipment, personnel, and support apparatus needed to complete the work. This includes all training and certification requirements for Investigator personnel and subcontractors employed by the Investigator.
- ❒ The proper collection, preservation, packing, shipping, and analysis of all samples, including the use of a laboratory accredited in accordance with Act 90 of 2002, Part 2.
- ❒ The proper handling and disposal of all wastes generated by field activities, including those generated by the laboratory conducting sample analyses.
- ❒ The health and safety of all "on-site" personnel.
- ❒ Documentation of all work completed. Raw data (including field logs and other hand-written materials) shall be legible, and in a clean undamaged condition.
- ❒ Any and all damage and/or loss resulting from Phase III field activities.

5.3.3.4 ASSESSMENT

Assessment of Phase III investigation data can include additional historical records and third party characterization reports, soil and groundwater quality data comparisons to Act 2 and MoFP criteria, analysis of permeability tests and groundwater monitoring data and conceptual understandings of the magnitude and extent of soil and groundwater impact and cost consequences to the transportation project.

INFORMATION COMPILATION

The Investigator will gather and organize all information from the investigation. All original data gathered should be made part of the project's technical files, and ultimately becomes the property of the Department. Original documents, documents generated as a result of the Phase III, or copies there of, shall not be distributed to any third party prior to review by the Department and without the expressed consent of the Department.

EVALUATION OF DATA

Upon obtaining and considering all relevant information, the Investigator, at a minimum, makes a **professional assessment** and **specific recommendation(s)** so as to adequately address:

- ❒ The type, extent, and anticipated migration path of identified contamination at a particular site relative to the highway project. This should include topographical setting, underlying geology, surface water flow, apparent (or indicated) groundwater flow, structure and utility characteristics, and other relevant site conditions.
- ❒ The impact, if any, that the identified contamination and site conditions may have upon environmental and human receptors, highway construction, and waste management. The health risk faced by personnel having contact with identified contamination through normal activities related to highway construction, for example archeological excavation, geotechnical investigations and construction.

- ❒ Regulatory requirements for remediation or additional characterization, as applicable.

It is possible that an evaluation of Phase III data may lead to the conclusion that additional Phase III investigations may be necessary in order to evaluate the likely cost of acquiring contaminated properties. For example, the discovery of contaminated soil around a regulated UST may lead to the conclusion that further soil sampling and a groundwater investigation is needed in order to determine the extent of contamination, and the cost of the cleanup liability that would be incurred during ROW acquisition using different alignment alternatives.

RECOMMENDATIONS

Based upon the evaluation of data and knowledge of the planned transportation project, the Investigator shall prepare the Phase III so that it contains sufficient information to develop the following items, if needed, without additional studies required for the project:

- ❒ Waste management alternatives and/or plans
- ❒ Engineering considerations and alternatives
- ❒ Cost/benefit (feasibility) analyses
- ❒ Alignment alternatives
- ❒ Health and safety plans for other invasive activities

At the discretion of the Department, these and other items may be added to the list of items minimally required to be addressed in any Phase III. The assignment of any additional items should be included in the scope of work.

Where assessment of the data collected identifies the potential for required remedial actions associated with contaminated media identified by the Phase III that will be disturbed during the planned construction activities, the investigator will assess the extent of potential remediation that will be necessary to complete the project. This can range from minimal soil excavation for offsite disposal based on subsurface impact that has migrated into the proposed ROW to closure of USTs followed by soil remediation and attainment demonstration. Regardless of the anticipated remediation scenario, the investigator will prepare a range in costs to implement the remedial action to aid the Department with future decisions including, but not limited to, assessing the need for revisions to the proposed project design and assisting ROW personnel with determining the fair market value of the property(ies). This basis of estimate may be requested by the Designer to supplement the Department corroborating estimate for the PS&E package.

SECTION 6 - REPORT PREPARATION GUIDANCE

SECTION 6 - REPORT PREPARATION GUIDE

The amount of documentation and detail required to report a waste site investigation depends on the scale of the transportation project and the number and complexity of actual or suspect AOCs/sites of concern. The Phase I, II or III waste site investigation report should define the purpose of the investigation relative to the transportation project and include data necessary to identify and clarify all actual or potential waste AOCs/sites within the PSA. The final report must clearly document activities conducted during every phase of the process. The documentation provided in the ESA report to Stakeholders is the basis for development of waste mitigation alternatives and ultimately, may be used in legal proceedings or cost recovery in real estate negotiations.

On occasion, data is obtained during site investigations that are incidental to the ESA process, but are of interest to other District programs.

- The District Environmental Manager should notify the District Geotechnical Manager of any groundwater, soil sample results, or field observations indicative of acid mine drainage.
- The District Environmental Manager should notify the District SEMP Coordinator of any field observations of 3rd party illicit wastewater discharges into PennDOT stormwater facilities, in accordance with policy established in PennDOT's Maintenance Manual, Publication 23, Chapter 8.

6.1 GENERAL GUIDANCE

The waste site investigation reports support transportation project planning, contribute to NEPA compliance, environmental regulatory compliance, the protection of worker health and safety, and help to reduce or eliminate project delays or unexpected costs associated with unidentified waste.

All relevant information should be included in Phase I, II and III reports. This information may include, but is not limited to: checklists, maps, pertinent historical data and appropriate tables, figures, and drawings. Raw geophysical data and aquifer test data must be supplied with reports for incorporation into the Waste Management Files and Project Technical Files.

PennDOT expects the consulting Investigator to stand behind the work product they have produced so PennDOT is able to use the work product for its intended purpose. The Investigator may not abridge its contractual obligations or limit its responsibility to stand behind its work product. However, statements to the effect that the consultant is not responsible for the impact of future environmental releases on the report's conclusions, or that the report's conclusions are limited by the accuracy of the consultant's sources, are generally acceptable. Project managers may call the Office of Chief Counsel at 717-787-5299 with questions, or if assistance is required to address inappropriate disclaimer statements.

Having stressed the importance of a complete, comprehensive report, it must also be stated that quantity is not always quality. **An effective, informative, and reader friendly document must be concise.** Suggestions to effectively communicate investigation methods, findings and recommendations are offered as follows:

- ❒ Follow the suggested reporting format provided herein and familiar to District Project/Environmental Managers and Roadway/SEMP Section.
- ❒ Consider use of an Executive Summary or prepare an introduction that clearly communicates the scope and pertinent findings of the waste site investigation to make an initial impression for the reader and to prevent waiting for the end of the report.
- ❒ Reference the associated scope of work or WIP for the background and rationale for implementation of the current Phase and identify deviations to plan due to unforeseen data collection and field conditions at the time of the study.
- ❒ Use concise field methods summaries, especially if methods include use of industry standard practices and consider placing equipment and method SOPs in an attachment for unique or specialized practices for reader reference, as required.

- ❒ Reference laboratory methods used in sample analysis, rather than in-depth detail about the analytical method.
- ❒ Prepare clear, concise tables, figures, graphs, charts, and photographs to convey the maximum amount of information in a minimum amount of space.
- ❒ Progressively minimize/eliminate discussion of waste sites during initial and successive Phase reporting that are located in the PSA, but outside the limits of inferred impact to the transportation project as that becomes clear from investigation findings and transportation project development.

Phase I and II reports are required to be submitted to the District for review and acceptance. At its discretion, the District may submit Phase I and II reports to Roadway/SEMP Section for review and comment. **Phase I and Phase II reports which recommend a Phase III investigation(s) must be submitted to Roadway/SEMP Section for review and comment before the report is finalized. Phase III reports are required to be submitted to both the District and Central Office for review and acceptance.**

Final Phase II and III reports for which the Practice of Geology was required for preparation shall bear a P.G. licensure seal, as appropriate, in compliance with the Engineering Land Surveyor and Geologist Registration Law, 63 P.S. §§ 148-158.2, as amended by P.L. 1151, No. 151 (Act 151) of 1992. The application of a Professional Seal to a final report demonstrates that the preparer of the report is professionally licensed in the Commonwealth, or has received responsible professional oversight by an appropriately licensed professional. In the waste site evaluation process, Practice of Geology by the Investigator consists of reviewing soil or groundwater data and/or interpreting published geologic information to arrive at site-specific geology-related conclusions. The evaluation of contaminant migration behavior in ground water and the selection of monitoring well locations are examples of functions requiring a licensed geologist in this context. The law, however, allows the use of a P.E. seal instead of a P.G. seal in cases where incidental Practice of Geology is performed, such as in the review of soil boring or groundwater data for comparison to regulatory standards.

6.2 RECOMMENDED REPORT FORMAT

While each report should be organized to address the individual issues associated with each project, the following general format is recommended by the Department:

- ❒ Executive Summary (optional)
- ❒ Introduction
- ❒ Transportation Project Description
- ❒ Background Information Review
- ❒ Field Assessment (as required)
- ❒ Investigation Methods
- ❒ Investigation Results
- ❒ Conclusions
- ❒ Recommendations
- ❒ Appendices

EXECUTIVE SUMMARY (OPTIONAL)

An Executive Summary (ES) is optional, its inclusion typically determined from the scale of the project/investigation. The larger the project/broader the investigation scope, the better a report is served by an ES. Alternatively, for small projects where the PSA consists of only a few properties, information normally contained within an ES can be summarized within the Introduction. The ES should detail the location and scope of the transportation project and associated waste investigation, the at-risk sites of concern and their potential for impact to the transportation project and recommendations for further action, as required. Put

succinctly, a Stakeholder should have a solid conceptual understanding of the scale and complexity of actual or potential waste issues to the project, the mitigation options and recommendations for further action after reading the ES. The balance of the report fills out the detail to substantiate the investigation findings and Investigator interpretations summarized in the ES.

INTRODUCTION

The Introduction should provide a concise summary of the proposed transportation improvement project, the studies undertaken and when, and principal results and conclusions most important to investigation objectives and Stakeholder interests. The introduction should not be used to reiterate detailed information contained within the body of the report. As stated for the ES, the introduction can substitute for the ES on smaller projects.

PROJECT DESCRIPTION

The project description should be concise, fitted to the scale and complexity of the project. The reader should be able to obtain a full understanding of the proposed project from the description. Typical information provided in the project description includes, but is not limited to:

- ❒ Size of the project (area)
- ❒ Geographic and cultural location
- ❒ Project needs
- ❒ Proposed right of way,
- ❒ Relationships to the existing transportation system and surrounding communities,
- ❒ Principal transportation features (elevated sections, piers, abutments, bridges, ramps, roads, stormwater BMPs)

The project description should also include locations and depths of planned project excavations to the extent known at the time of the particular waste site investigation phase. For Phase I reporting, utility excavation depths and locations will need to be estimated, because utility relocation planning does not take place until Final Design.

BACKGROUND REVIEW

The background review will contain pertinent information that aids establishment of the investigation rationale and scope. For the Phase I which initiates the investigation process background material may be limited to that provided by the District Waste Management File and might include actual and potential waste findings from the early phase of the NEPA process or an earlier completed Preliminary Area Reconnaissance, (PAR). For subsequent Phase II and Phase III reports, background content should become progressively more focused to those actual or suspected waste AOCs/sites that have triggered the subsequent phase(s).

Background should include concise summaries of the Phase I findings obtained during the review of databases, interviews, and other file review information. Examples of this type of information are contained in ***Appendix A*** on the Phase I Site Assessment Form. Waste sites of concern use history, file review information, aerial photography reviews, soils, hydrology, and geology information should all be described within this section, ***if applicable***.

NOTE: Graphics and figures are especially helpful within this portion of the report. U.S. Geologic Survey (USGS) maps can be used to illustrate the project location. Engineering plans can be used to provide the reader with a visual image of the proposed project. By using graphics, maps, and figures within the document, information is clearly conveyed while maintaining a concise and informative report.

FIELD ASSESSMENT

This section includes information obtained from the field views used to scope the phase investigation, a***s appropriate***. Information contained within this section may include, but is not limited to: site maps (to scale if possible), pertinent project area/site features, potential concerns noted in the field, and references to methodologies and techniques utilized to conduct the field assessment.

INVESTIGATION METHODS

Establishing the method of data collection is an essential component of quality assurance. Investigation data are the foundation on which risk is interpreted and mitigation options are ranked and implemented, typically at considerable cost. Improper or incomplete collection of records or environmental samples erodes the confidence and reliability of the data and therefore investigation interpretations and conclusions. Methods must always be established prior to results presentation and results presentation must always precede interpretation and recommendations.

Data collection methods are first established in the scope of work and WIP that precede the investigations to assure the District and Roadway/SEMP Section are confident in the Investigator and the Investigator approach and implementation of the study. Many of these data collection methods are standard to the industry now and do not require involved detail, but rather concise descriptions of the critical path elements to assure establishing that proper data collection methods were employed.

File review, interview and site inspection procedures, sample locations, depths, drilling methods, field screening methods, groundwater sampling and testing methods, quality assurance sample collection and data analysis methods must all be documented along with any deviations from plan. Deviation or modification of methods due to field conditions must always be noted and then qualified, as required, relative to meeting objectives of the study.

INVESTIGATION RESULTS

This section of the document is allocated for the presentation and discussion of collected information, whether nonintrusive Phase I data or Phase II and III geophysical and laboratory analytical data. Reducing raw information and data into usable presentation formats is essential to communicating findings. For Phase I reports, PennDOT advocates use of a risk matrix or table that identifies and ranks actual and suspect AOCs and sites from most critical to least understood, to provide the reader on line-of-sight both a summary of pertinent results and likely impact to the project. Raw data from records searches, interviews, site reconnaissance photographs, occasionally third party investigation/remediation reports or subsections all must be attached/appended to the report. Sometimes multiple volumes aids report presentation, one volume used for the report and associated figures and tables and another volume(s) used for appendices.

Geophysical investigations are often conducted by a subcontractor specialist to the Investigator. Whether the Investigator performs the study or a subcontractor, reporting requirements remain the same. The investigator must concisely summarize the rationale and scope of the investigation, the methods of investigation for each tool, for example GPR surveys versus EM surveys, and must review findings and provide reasonable interpretation of results with relevance to the transportation project. Since geophysical surveys are primarily used to identify and locate/orient USTs, conclusions focus on those objectives. Further speculation about tank and line integrity or release potential is beyond the capability of the tools and would be groundless conjecture. As steel tanks age/rust, the strong EM contrast with earth materials can decline and diffuse, but that neither confirms nor denies the presence of impact. Raw instrumentation data must be appended to the report and reduced into images and signal strength contour figures. If a subcontractor performs the survey, the subcontractor report must be appended to the Investigators Phase II/III report.

For Phase II and III reports where testing of environmental samples is involved, raw data must always be attached/appended, but must be reduced into readily usable tables and/or figures. These tables can be imbedded in section text, or attached after the body of the report, depending on how extensive the data/study. Commonly, data dedicated to a particular AOC, site of concern or media (soil vs groundwater) are placed in separate tables for ease of reference and correlation to the AOC/site of concern. For commercial roadway projects where dozens of properties maybe investigated, with fewer found to be of actual concern, it is best to

dedicate results to separate tables by site, instead of comingling samples from multiple sites into a single table. Mitigation decisions are often determined and implemented on an original parcel basis, and further so based on media, for example soil and groundwater, so the presence of other site samples or the comingling of soil and groundwater samples in the same table complicates risk communication, future phase reporting and mitigation decision making.

Phase II and III data must be compared to applicable regulatory standards, typically MoFP and/or Act 2 standards, as these govern soil reuse options within the ROW, export out of the ROW and treatment and disposal options. For impacted groundwater samples where future probable construction dewatering is a concern and surface water discharge is a potential option, sample results must also be compared to Chapter 93 surface water criteria. Data tables can list all analytical results, only those results detected above laboratory method detection limits (MDLs), or occasionally only those results that exceed one or more applicable standards. Special care must be taken with reporting "nondetects" where the laboratory reporting limit is above an Act 2 or MoFP criteria. For tables where only detects or exceedances are displayed, these MDL exceedances of standards must also be included in the table and then discussed in terms of relevance and applicability.

Of special note, whereas Act 2 groundwater standards regulate dissolved levels of constituents, Chapter 93 regulates total concentrations of parameters in surface water. Accordingly, where heavy metals are contaminants of concern for the treatment and discharge of excavation dewatering fluids, groundwater sample analysis should include total as well as dissolved metals analyses. Based on recent experience, this regulatory detail may be significant near pre-1986 gas stations, where total lead levels in groundwater can be high even when dissolved lead levels are very low.

A Phase II or Phase III investigation and subsequent report that provides TAL metals analytical results without prior approval from the District may be rejected as failing to meet Department specifications stipulated in Publication 281.

CONCLUSIONS

The Conclusions section assembles and interprets investigation findings to assess the risk of individual suspect waste site impacts on the transportation project. The Phase I report discusses pertinent records reviews, interviews and site reconnaissance information in relation to the project description. The Phase II and/or Phase III report compares geophysical and laboratory analytical data to applicable standards, in order to characterize probable waste site impacts on the project, and if possible delineate the lateral and vertical extent of contamination or waste in the project right-of-way.

A principal objective of this information and data review is a "gap analysis" performed to identify shortages of information relative to one or more investigation objectives. Indeed, gap analysis is fundamental to a phased investigation approach advocated by PennDOT. It is an important driver to implement successive, more focused levels of investigation to acquire the information missing at the end of the prior phase. It contributes to concluding remarks and further action recommendations.

Lastly, data interpretation must lead to concise conclusions relative to study objectives. District Project Managers and consulting Designers are not so much interested in the data produced by a study, but rather the implications and ramifications of that data on project planning and design. It is insufficient to declare that USTs exist at a site without concluding: 1) the potential for release impact to soil and/or groundwater, and 2) the resultant waste impact to the project. The report must compare the potential extent of soil and groundwater contamination with the location and depths of planned project excavations and the project right-of-way, including property to be acquired. Conversely, it is of little benefit to Stakeholders when an Investigator invests time to review an AOC that will have little to no impact to the transportation project. Petroleum contamination at a 3rd-party UST corrective action site has very little chance of impacting a roadway project if the water table is much deeper than planned excavations, and the former USTs and associated soil contamination are located far away from the right-of-way, property acquisitions and project excavations. There may be extensive contamination, but if PennDOT is not acquiring it, or intercepting it during construction, the attention given in results presentation, interpretation and concluding remarks should be consistent with its low to inconsequential risk.

RECOMMENDATIONS

All Phase I, II, and III reports must contain recommendations on behalf of the Investigator. The four principal recommendations reviewed within the context of waste investigation procedures in Section 4.0 must be incorporated into the final report:

- ❒ ***No further action***
- ❒ ***No further action, at this time***
- ❒ ***Initiate Phase II or Phase III***
- ❒ ***Initiate immediate action***

These recommendations can be made on an AOC basis or on an AOC/Site basis. The recommendations are based on data analysis, including gap analysis, and study conclusions. The recommendations form the basis to: 1) stop further evaluation of a suspect waste feature, 2) move on to another level or phase of investigation, or 3) move on to another round of more focused investigation in the case of a Phase III. Recommendations should be keyed to the Phase I risk matrix, or Phase II/III figures and data tables for context, especially if data gap filling is a principal driver of the recommendation.

APPENDICES (AS APPLICABLE)

Possible Appendices may include, but are not limited to, the following examples:

- ❒ Computer database search report
- ❒ Air photographs
- ❒ Maps
- ❒ Agency file review documents
- ❒ All or portions of third party investigation/remediation/monitoring reports
- ❒ Geophysical survey data/subcontractor report
- ❒ Laboratory analytical reports
- ❒ Soil boring/test pit logs and monitoring well specifications
- ❒ Field contaminant screening data
- ❒ Water level and flow measurements
- ❒ Permeability test data
- ❒ Survey data
- ❒ QA/QC information
- ❒ field checklists/forms
- ❒ Sample location photographs

6.3 REPORT SCHEDULE AND DISTRIBUTION

The Investigator will develop a draft final and final report for each phase of waste site investigation, unless the District instructs otherwise during scope of work development. This allows the District and as required Roadway/SEMP Section to review the methods and results of the investigation and most importantly the recommendations to assure the Investigator scope of work and Department objectives have been adequately satisfied. Provided below is the preferred sequencing of draft and final Phase I, II and III report submissions and comment Reponses, as required.

The reporting schedule and distribution for a Phase I, II, or III report is as follows. Each phase of investigation requires preparation and submission of a draft final and then final report, unless modified by District at the time of scope of work development. In all cases, draft final and final Phase I, II and III reports are submitted to the District. If the Phase I report recommends a Phase II, only the District must authorize it and approve the scope of work. If a Phase I or II report recommends a Phase III, Roadway/SEMP Section must review the Phase I/II report(s) and recommendation. Phase III draft and final reports are also submitted to Roadway/SEMP Section, coincident to submission to District, or after, as instructed by District.

Submission and distribution of the Phase I, II and III report is as follows:

a. Draft Report

Investigator submits the complete (text, tables, figures and appendices) draft final report to the District, and as required Roadway/SEMP Section according to the project schedule agreed to during scope of work development. The report format must conform to District requirements and is typically a hardcopy bound report or electronic mailed (email) portable document format (PDF) copy of the complete report, with or without an editable copy of the text. In some cases the Department may request an oral report. The District and as required Roadway/SEMP Section will review the draft final report and may develop written comments. The District and/or Roadway/SEMP Section, at either discretion, may choose to discuss the report with the Investigator prior to issuing comments. The District provides the Investigator with District and as required and available, Roadway/SEMP Section written comments with suggested /required amendments to the draft report.

b. Final Report

The Investigator reviews District/Roadway/SEMP Section comments and in most cases develops written responses, answering Department questions and concerns and providing guidance on how the draft report will be revised. The investigator incorporates Department comments into revision of the draft final report and presents responses to comments and the unsigned Final report to the District and Roadway/SEMP Section. If found acceptable, the Investigator submits the signed Final report to the District, which documents approval via an approval memo. As appropriate, a P.G. or P.E. seal may be required, in accordance with licensure laws and regulations.

In those instances where the assessments of the District and the Investigator differ, a dispute resolution discussion should be initiated; however, ***the District has the final decision on the recommendation to be included in the report.*** The Investigator may note differing assessments along with the District rebuttal in an appendix of the final report.

6.4 WASTE MANAGEMENT RECORDS FILE

The District Environmental Unit is responsible for establishing and managing the project Waste Management Records File. The purpose is to ensure that all NEPA documents, for example EIS and associated technical files/records on the project, relative to waste-related concerns, including forms EDD-VI and EDD VII, are maintained. All relevant information is to be included in the Waste Management File contained within the overall project file, including, but not limited to: correspondence, documents, Consultant agreements, memoranda, transmittals, meeting minutes, telephone logs, reports, analytical results, waste management plans, relevant waste management portions, Plans, Specification and Estimate (PS&E) packages, and supporting studies for project environmental clearance documents. Table 5-1 summarizes the waste record maintenance requirements.

EDD-VI and EDD-VII forms and documentation that are completed in support of Maintenance activities are normally not maintained by the District Environmental Unit, but rather are maintained in a Waste Management Records File by Maintenance staff either at the District Office or in the County Maintenance Office.

In addition to these documents, there are records retention requirements concerning hazardous waste. It is PennDOT's policy that hazardous waste management documents are to be retained for twenty (20) years, instead of three years as required by federal and state regulations. These records include, but are not limited

to: manifests, disposal certificates, waste characterization results, remediation reports, etc. Any of these records must be furnished to the appropriate regulators (i.e., PADEP, US EPA, OSHA, etc.) upon request.

Where contaminated soil or groundwater, Regulated Fill (see Section 7.4, Due Diligence with Fill) or other waste will remain within the PennDOT right-of-way following the completion of construction activities, it is recommended that project records that characterize and delineate the extent of the waste should be maintained by the District indefinitely, or until the waste is no longer an environmental or human health concern. This includes documented contamination that has migrated into the PennDOT ROW from 3rd-party waste sites.

There are also records retention requirements for certain PennDOT employee classifications involved in hazardous waste handling, as specified in the Employee Safety Division guidance memo, Medical Surveillance for Field Employees, PPIM #Z-09-107 (October 5, 2009). Specifically, for the affected job classifications, the PPIM states, "a permanent record of all [medical] tests must be maintained for the duration of employment plus 30 years and kept on file in the employee's official personal medical file [at the District Human Resource Office]." For further information, please contact Employee Safety Division at 717-787-3460.

Table 6-1
Waste Management Records Retention

Document	Regulation		Comment
	FEDERAL 40 CFR	STATE 25 PA Code	
Residual Waste Documents: i.e. shipping records, disposal records/manifests, etc.	Not Applicable	Chapters 287.52 287.55	Must be maintained a minimum of 5 years
Hazardous Waste Documents: i.e. Manifests, annual & biennial reports, etc.	Sections 262.40 268.7	Chapters 260-270	Must be maintained for a minimum of 20 years, by PennDOT policy (regulations require 3 years)
Site Characterization Reports	Section 280.74	Chapters 245.310-311 250.204 250.312 250.408-410	Section 280: Federal Underground Storage Tank (UST) Regulations Chapter 245: PA UST Regulations Chapter 250: PA Act 2 Regulations
Environmental Due Diligence Forms EDD-VI and EDD-VII	Not Applicable	287.2 287.55	Must be maintained a minimum of 5 years
Health & Safety and all personal medical records	29 CFR 1910.120	Not Applicable	All personal records are confidential and must be maintained in the individual employee's personnel file.

SECTION 7 - WASTE MANAGEMENT CONTRACT DOCUMENTS

SECTION 7 - WASTE MANAGEMENT CONTRACT DOCUMENTS

Following completion and acceptance of waste site investigation results and determination of AOCs/sites that will or could impact construction with waste issues, waste investigation results are further used to develop waste management contract documents. There are two principle types of waste management documents used in PennDOT construction contracts:

- ❒ Waste management special provisions
- ❒ Waste Management Plan (WMP)

These documents instruct a contractor what must be performed to manage anticipated environmental waste on a project and the measurement and payment method for managing that waste accordingly. Special provisions are typically focused to a specific waste situation, AOC, or site within a larger transportation project ROW. A WMP is typically scaled for larger waste concerns and may incorporate waste SPs in its deployment.

This section reviews the rationale and development of SP's and WMP's, providing some examples for their respective use. The section provides PennDOT mandated guidance on the use of PADEP's systematic random sample (SRS) collection method associated with soil removal during UST closure-via-removals. Lastly, the section finishes with review of the PADEP MoFP, which is fundamental to construction earth work, waste soil classification and waste soil reuse and disposal during transportation project construction and maintenance and stockpile facility and roadway maintenance activities.

7.1 WASTE MANAGEMENT SPECIAL PROVISIONS

Construction contract bid items are typically by unit/lump sum for each specific component of the work required for completing the project. Contract bid items that cannot be developed into a generic specification are considered Special Provisions to the contract documents. They are used to provide a means for contractors to bid on the special work requirements. They are also legal documents whose interpretation may be challenged in court. It is important, therefore, that the special provisions be written in sufficient detail for proper interpretation.

7.1.1 APPLICABILITY

All waste management-related special provisions must be prepared in accordance with **Publication 408 format**. Standard Special Provisions (SPs) are maintained in ECMS, and thus PennDOT is no longer maintaining hardcopy format. A current listing of all Standard SPs, by index, may be found on the ECMS website at: http://www.dot2.state.pa.us – click on "Construction Projects," "Resources," then "Special Provisions". This section provides an overview of the considerations that should, or must, be followed when developing waste management-related SPs.

7.1.2 GENERAL GUIDANCE

The SP format provides for a brief, narrative description of the scope of work to be performed; a list of materials to be used; a more detailed description of specific work requirements; and the method of payment.

An SP contract item number consists of eight digits, with a dash following the first four digits. Contract items with the first four numbers beginning 9000-XXXX, are used for non-standard contract items, such as waste management-related items.

Example: ITEM **9000-0001** – HEALTH AND SAFETY PLAN

Waste management-related SPs for specific items of work should be written using the same format as found in PennDOT's Publication 408.

Example: ITEM NUMBER

DESCRIPTION

MATERIALS

CONSTRUCTION

MEASUREMENT AND PAYMENT

Some key considerations in the preparation of waste management-related Special Provisions are as follows:

- ❒ All Waste Management-Related Special Provisions should be written in the imperative mood. (See Pub. 408, Sec. 101.01)
- ❒ All Waste Management-Related Special Provisions should be written in gender neutral language.
- ❒ PennDOT Publication 408 should be used for all work and contract provisions, as much as possible.
- ❒ When standard provision language is to be used within another special provision, it should be done by reference, with any applicable modifications necessary.
- ❒ The use of a "brand" name is not allowed. When a generic specification cannot be used, at least three (3) brand names must be specified followed by **"or approved equal"** or **"or equivalent."**

Care should be taken to identify who is responsible for tasks to be performed under the SP and what is included in each task. For example, landfill disposal of waste may simply include transportation, disposal/tipping fee and shipping administration costs, or it can include waste characterization for the landfill, siting and rental fees for waste containers, staging and loading of waste, transportation costs, manifesting and reporting to PADEP and/or EPA, with additional excavation- and backfill-related tasks that may or may not be in a separate SP. The variation in measurement and payment is dictated by the requirements of the project.

Where soil or groundwater testing will be required, SPs should specify each analysis to be performed. For example, heavy metals analysis could be for lead only, RCRA metals, PPL metals, or in rare cases, TAL metals.

Appendix B contains example SP for waste-related work items. This example should be used as a guide in the development of SP for project-specific needs. Submission of SPs to Roadway/SEMP Section for review is not required, when a WMP is not necessary to address waste management. For further guidance on drafting specifications, see PennDOT Publication 693, *Specification Review Manual, Chapter 4, Developer Guidance for Writing Specifications.*

7.2 WASTE MANAGEMENT PLAN DEVELOPMENT

The WMP provides the Contractor a description of the scope of waste management tasks to be completed for the project. The WMP lists the type(s) and concentration(s) of contaminants identified and/or suspected, and the area(s) and volume of contaminated media or debris to be impacted by the highway project. **Appendix C** provides an example outline for a WMP.

7.2.1 APPLICABILITY

Following the issuance of the Record of Decision (in the EIS), Finding of No Significant Impact (in the EA), or approval of the CEE, PennDOT has the authority to begin final design activities. The District Office should typically begin preparation of the WMP and/or waste management-related SPs at completion and interpretation of Phase III investigations and no later than PS&E development. A strategic consideration at this time is use of the ERS contract to remediate specific concerns like active or abandoned UST systems ahead of general project construction to prevent or minimize the need for SP driven Contractor corrective action during construction. This is especially important where a large transportation project may be phased over time and environmental concerns could remain for multiple years until the given construction phase/stage is ready to be implemented.

Important: The District should be apprised of any last minute changes in design or right-or-way acquisition. These project modifications may:

- ❒ Affect anticipated project impacts from prior identified contamination.
- ❒ Result in additional project impacts from new areas of known or suspected contamination.
- ❒ Create an unknown risk of project impact from properties or areas previously outside the required ROW, which have not yet been investigated.

Changes in final design can impact planned waste management in a number of ways. The resultant scope of the WMP may have to change in response. Two examples illustrating how changes in design effect waste management and WMP preparation are provided below.

Example 1

Excavation depths will be greater than originally planned in an urban industrial area with a deep layer of Historic Fill and other buried residual waste, affecting contract bid documents and increasing landfill disposal costs for the excavated waste.

Example 2

In a road project in which excavations for a stormwater basin will be deeper than originally planned, and potentially contaminated groundwater may be encountered, a Phase III groundwater investigation is deemed necessary, and the presence of contaminated groundwater is confirmed. As a result, waste management must include the handling and treatment or disposal of contaminated excavation dewatering fluids during construction. Also, the stormwater basin design plans are revised to include a liner to prevent the infiltration of contaminated groundwater into the stormwater system, or further leaching and plume expansion due to infiltrating stormwater.

When remedial actions involve simple routine excavation and disposal activities ("dig and haul"), or involve AST/UST removals with localized or no significant contamination, the scope of remedial actions can be developed into waste SPs without the need for preparing a detailed WMP. Likewise, SPs will normally be sufficient to support construction activities requiring the dewatering, treatment, and discharge or disposal of contaminated groundwater from excavations, if present.

Because UST removals have an established procedure for their closure and the remediation of associated contaminated media, development of a WMP detailing the procedure for tank removal is not necessary, where localized or no significant contamination, as defined in the PADEP UST closure guidance, is known to be present. The Description section of the SP can adequately detail the work required. However, if the presence and/or anticipated extent of impact is not known prior to implementing the tank removal activities, the Department recommends that a WMP be prepared to address the potential for remediation activities to be completed.

Development of a WMP is advisable when the most feasible waste management action(s) identified involves:

- ❒ Significant contaminated soil excavation from a single site or multiple sites of concern
- ❒ UST removal and remediation involving extensive contamination, as defined in the UST closure guidance
- ❒ Significant impacted groundwater dewatering and treatment at one or more sites of concern
- ❒ Utility corridors require pathway elimination through shallow contaminated groundwater
- ❒ A Complex third-party remediation technology (i.e. bioremediation, soil washing, etc.) is acquired by PennDOT and will be decommissioned by the Contractor during construction

Contaminated soil and groundwater requiring management and coordinated temporary storage in the ROW. These circumstances will require more detail and material specifications than could be provided solely using

SPs. Projects that require the development of a WMP and Special Provision documents must be submitted to Roadway/SEMP Section for review.

7.2.2 WMP DEVELOPMENT GENERAL GUIDANCE

The WMP should provide a clear, definite, and complete description of the goals of waste management during construction. The WMP only indicates **what** is to be done to manage waste, not **how** the waste must be managed. It is the Contractor's responsibility to develop and implement the waste management approach(es). The WMP should describe the necessary goals, objectives and requirements for the Contractor to bid and complete waste management during construction. See **Appendix C** for additional guidance

The Waste Management Plan should contain, as applicable, the following items:

- ❒ A brief summary of the Phase III investigation findings identifying the type, concentration(s), extent and volume of contaminated media or wastes, and recommendations and conclusions of the Department's waste site investigation(s). Certain major waste types (e.g. hazardous waste) should be identified as not having been found at the site, as appropriate, even though testing did not confirm the absence of this waste type.
- ❒ A detailed description of the waste management objectives and actions to be achieved and undertaken by the Contractor, including all necessary plans and specifications. All material or equipment specifications can only require the type (i.e. tracked excavator, air-stripper, etc.) of equipment or materials, and may not be manufacture-specific (i.e. CAT 215 Excavator, Carbonair STAT Air Stripper System, etc.). Limits on the extent of excavation should be specified if applicable, for example, where the use of a temporary construction [surface] easement requires the removal of surface but not subsurface contamination.
- ❒ Performance standards, including, but not limited to:
  - Minimum pumping rate
  - Use of a particular industry standard
  - Publication 408 specifications
  - Fill management in accordance with PADEP standards
  - Regulatory cleanup standards and standard attainment demonstration criteria
  - Environmental Covenant implementation plan objectives
  - Use of a permitted treatment and reuse facility for contaminated soil disposal
- ❒ Supporting documentation, including:
  - Site Maps
  - Highway design plans with impacted areas delineated
  - Remedial design plans and specifications sheets
- ❒ A summary table of any environmental sampling analytical results (If analytical data is extensive, they can be provided as appendices, or by reference)
- ❒ An Acronyms and Definitions Section to identify and clarify any terms used within the document

7.2.3 CONTRACTOR WASTE DOCUMENT SUBMISSION

The WMP should state the required contractor document submissions, and specify the requirements/detail that is to be provided in each submission. Required document submissions include the following:

- ❒ Site Work Plan (SWP)
- ❒ HASP

The SWP answers the requirements identified in the WMP and provides the methodology and steps the Contractor will take to demonstrate how the Contractor will classify, handle and dispose of wastes at sites identified in the WMP in coordination and compliance with the NPDES permit. The SWP details specific equipment and materials the contractor proposes to use to complete waste management. Additional items to be included:

- ❒ Schedule of waste management activities, indicating the sequence and duration of activities.
- ❒ Erosion & Sedimentation Plan
- ❒ Dust Mitigation Plan, as required
- ❒ Waste Handling Plan (how waste will be removed, staged, stored, transported and disposed)

The HASP will be site-specific and will detail the methods and procedures to safe guard Contractor while performing waste management duties, or activities where environmental impact could adversely impact workers, like heavy metal laden dust. This plan should conform to OSHA standards at 40 CFR 1910.120. In addition, the following items should be included:

- ❒ Air Monitoring Plan (if applicable)
- ❒ Personal Protection & Equipment Plan
- ❒ Decontamination Plan
- ❒ QA/QC Plan

7.3 SAMPLING GUIDANCE FOR UST CLOSURE-VIA-REMOVAL

When UST closure involves the remediation of extensive contaminated soil as defined in the UST closure guidance, PADEP regulations provide two options for demonstrating the attainment of soil remediation standards, biased sampling and systematic random sampling. **It is PennDOT's policy that systematic random sampling will be used following the excavation of contaminated soil associated with a tank closure.** This policy must be identified in SPs and WMPs when storage tanks and associated soils are an identified waste concern requiring Contractor removal and management during construction.

The Contractor will perform soil attainment sampling pursuant to 25 PA Code Chapter 250.703(d) and the stated sample frequency based on actual excavation volume. PADEP provides a spreadsheet to design a systematic random sampling scheme on their website under Land Recycling Program. The WMP or SP must state the location and estimated volume of impacted soil to be removed to allow the Contractor to identify the sample frequency relative to anticipated excavation volume.

The SP or WMP will identify the laboratory analytical suite(s) to be analyzed for each attainment sample, based on waste site investigation results and prior determination of constituents of concern. In most cases the PADEP short lists for leaded/unleaded gasoline and diesel fuel will be sufficient to characterize final soil quality. In addition to analyzing for site-specific contaminants identified during the Phase III(s), treatment and disposal facilities typically require additional analytical parameters to satisfy facility permit(s). The landfill's analytical parameters usually differ from those used for the attainment demonstration, and may include TCLP testing, as well as total analysis for Petroleum Hydrocarbons (PHC), PCBs, and other compounds. The SPs or WMP must direct the Contractor to identify both sets of sample parameters in the SWP to assure soils can be disposed of timely.

The contractor details how the PADEP systematic random sampling will be performed following UST removal and impacted soil excavation in the SWP. The Department understands that the proposed approach may require revisions based on field conditions encountered following excavation, for example larger/smaller excavations than planned or the presence of groundwater at the base of the excavation.

The Contractor reports the final sampling approach in the WMP specified interim or final reporting. Copies of all work sheets must be attached for substantiation of method use.

7.4 DUE DILIGENCE WITH FILL

This section of Publication 281 provides guidance to PennDOT and its contractors for the performance of Environmental Due Diligence (EDD) to comply with PADEP's MoFP, a clean and lightly contaminated soils guidance package revised by PADEP on August 7, 2010. This guidance package provides specific requirements for the management of fill exported outside the construction or maintenance ROW, or fill imported to the ROW. Waste SPs and WMPs must identify compliance points with the MoFP during construction to assure the Contractor complies with the MoFP during soil import and export. The MoFP **only** applies to fill: 1) moved off site from the construction or maintenance project area or project ROW in which it has been generated, and 2) imported to the project area or project ROW (including from another PennDOT project). The MoFP **does not** apply to fill generated and reused within a project area or project ROW, including fill temporarily staged outside the project ROW and later used as structural fill within the project ROW, such as may occur with the use of temporary construction easements. Note: Fill reuse in operating quarries is governed by PADEP policy document #563-2000-301, Use of Reclamation Fill at Active Noncoal Sites, rather than MoFP. PADEP noncoal mine Reclamation Fill standards are generally more stringent than MoFP criteria.

The MoFP defines Clean Fill and Regulated Fill. **Appendix D** contains a flow chart for identifying Clean or Regulated Fill. As defined in the MoFP, the term "fill" includes "soil, rock, stone, dredged material, used asphalt, and brick, block or concrete from construction and demolition activities that is separate from other waste and recognizable as such." Fill is unregulated either if it is unaffected by a spill, or if it is affected by a spill or release, but chemical analysis shows concentrations of regulated substances to be below Clean Fill Standards identified in the Tables FP-1a (organic constituents) and FP-1b (inorganic constituents) in the MoFP. Concrete and used asphalt materials removed from highways and bridges are considered Clean Fill unless this material is identified to be affected by a spill or release of a regulated substance; staining of highway pavements from normal vehicular use (such as spots from minor oil leaks) is **not** considered to be a "spill or release."

Fill is considered Regulated Fill if it meets the definition of Historic Fill, or if it is affected by a spill or release, with contaminant concentrations above Clean Fill standards within the Regulated Fill standard range. Though more complicated to reuse than Clean Fill, Regulated Fill may still be used beneficially offsite if it meets the requirements of General Permit WMGR096 including contaminant concentration limits identified by the Tables GP-1a (organic constituents) and GP-1b (inorganic constituents) in the general permit. The MoFP **does not** apply to fill both generated and reused within a project area or project ROW. For onsite reuse, contaminant levels should be compared to Act 2 MSCs instead, as applicable. Note that Historic Fill may be reused onsite if waste site investigatin determines that the Historic Fill will not exceed Act 2 standards.

Of note, the MoFP definition of Historic Fill is slightly inaccurate, due to the passage of Act 7 of 2018, which exempts Current Generation Slag from waste status. Current Generation Slag is an iron or steel foundry slag generated after January 1, 2007 that is uncontaminated, has not been mixed with other waste, and has been sold and reused as a commodity.

In some areas of the Commonwealth, naturally occurring arsenic may be found above the 12 mg/kg Clean Fill standard. To address this issue, PADEP has added a footnote to the Clean Fill Concentration Limits Table for metals and inorganics (Table FP-1b), indicating that fill materials with a concentration of arsenic between 12 mg/kg and 20 mg/kg may be managed as Clean Fill, if used in a construction activity employing a PADEP-approved Best Management Plan (BMP) for that work. An E&S and/or Storm Water Management Plan approved by PADEP or the County Conservation District is considered to be an approved BMP. Either of these plans must indicate how direct contact with the fill materials (containing elevated arsenic concentrations) will be prevented and the plan must provide a map or sketch showing the exact placement of this fill.

Laboratory contamination of samples with cobalt through the use of a tungsten carbide mill for pulverizing samples has been documented. Because the Regulated Fill standard for cobalt is very low, in the unusual

circumstance where fill analysis for cobalt is required, the Investigator shall instruct the laboratory not to use a tungsten carbide mill for sample preparation.

It has been PennDOT's experience that naturally occurring background levels of cobalt, arsenic or boron in an area may exceed Clean Fill or Regulated Fill standards. Fill with naturally elevated inorganics levels is not subject to MoFP use restrictions if the fill is otherwise unaffected by a spill or release. This fill may therefore be managed as Clean Fill, provided that the following conditions are met:

- ❒ The material meets the definition of Clean Fill
- ❒ Supporting site characterization data is available. Examples: 1) Fill consists of previously undisturbed native soil that could not have been impacted by a spill or release; 2) Inorganics test results exceeding Table FP-1a values are similar to test results from nearby properties, another area in the PennDOT right-of-way, or soil survey data from published sources.
- ❒ The intended reuse of the fill will not violate other environmental statutes, rules and regulations, including the Clean Streams Law, Chapter 103 (Erosion and Sediment Control), and Chapter 105 (Dam Safety and Water Management).
- ❒ A property owner can be found who is willing to accept the fill, or the fill can be reused on another PennDOT right-of-way.

The MoFP definition of Clean Fill requires the fill to be non-water soluble, non-decomposable and inert as well as uncontaminated. Soil heavily contaminated with fertilizer or salt cannot be reused as Clean Fill because it is partially soluble. Organic waste from clearing and grubbing cannot be managed as Clean Fill because it is decomposable. Acid-producing rock, as determined using Geotechnical Manual (Pub 293) test procedures, cannot be managed as Clean Fill because it is reactive rather than inert.

In some cases, a receiving property owner who is willing to accept excess fill cannot be found, and it must be landfilled. In this situation, establishing Clean Fill status may still be necessary because landfill disposal fees are much lower for Clean Fill than for residual waste such as Regulated Fill.

The selection of chemical analytical procedures for the EDD Phase II testing should be specific to the contaminants of concern that were identified by the EDD Phase I. Testing for an expanded list of the contaminants found in Tables FP-1a and FP-1b of PADEP's MoFP should only be performed when the nature of the release is completely unknown or the release contains a broad mixture of constituents. In nearly all circumstances, the list of analytical parameters can be reduced to a more manageable list of contaminants of concern. Roadway/SEMP Section staff can assist District staff in this determination. Under no circumstances shall analysis be performed using the TAL Metals suite, or the full list of inorganic compounds or heavy metals from MoFP Table FP-1b, without written approval from the District.

Note: On the rare occasion when extensive testing for a completely unknown release is deemed necessary, it is recommended that the list of organic analytical parameters from Table FP-1a should be limited to TAL organic compounds. Valid analytical results cannot be obtained for the entire MoFP Table FP-1a list because many of the Table FP-1a compounds lack an approved analytical method.

7.4.1 HIGHWAY CONSTRUCTION PROJECTS

For all transportation projects, during Design prior to advertisement for construction, the PennDOT Design Project Manager or designee shall conduct Clean Fill due diligence determinations for all potential excess excavated material using PennDOT's Environmental Due Diligence (EDD) forms EDD-VI and EDD-VII to document the inspection. Forms EDD-VI and EDD-VII are available online at PennDOT's Forms and Publications web site, indexed as forms D-1 and D-2, respectively. The forms were designed to provide an efficient method for documenting MoFP compliance during construction-phase earthmoving activities.

The Investigator may assist the Designer with identification of Clean Fill sites and the completion of Forms EDD-VI and EDD-VII, as applicable. In the ESA process, Form EDD-VI is used to document the characterization of fill based on records and site reconnaissance. If a suspected spill or release, or the presence of Historic Fill is identified, Form EDD-VII is also completed in order to document the fill determination,

supported by additional investigations results such as laboratory analytical data. Where a Clean Fill determination is based upon analytical data, and the fill is reused offsite as structural fill, PADEP MoFP Form FP-001 must be completed as well as PennDOT Forms EDD-VI and EDD-VII, and the completed form FP-001 (with supporting analytical data) must be submitted to both PADEP and the receiving property owner.

A single Form VI can be used for multiple sites, provided applicable sites are identified. However, one Form VII should be used per site/AOC where testing confirmed compliance with Clean Fill standards, in order to provide flexibility in Clean Fill export and Form FP-001 completion.

It should be recognized that despite the use of Forms EDD-VI and EDD-VII supported with Phase I, II and III findings, Department declarations of Clean Fill, especially without analytical data, may not be accepted by a receiving facility, usually for one of two reasons. Where fill is to be reused as Clean Fill, the receiving property owner may require more extensive testing to assure confidence in Clean Fill status. Where a property owner cannot be found to reuse the fill as clean structural fill, and landfill disposal is the only available option, the landfill may require more extensive testing in accordance with its operating permit, in order to justify a lower disposal fee as Clean Fill instead of residual waste. The waste SP or WMP for the project should identify the Contractor's obligation to comply with the MoFP, the scope of additional testing, use and distribution of PADEP Form FP-001 and demonstration of MoFP compliance to the Department.

Project waste SPs and/or WMP should further stipulate that Regulated Fill to be exported from the project ROW by the Contractor must conform with General Permit WMGR-096 and PADEP Form RF-20. Any further testing of soils identified by Department waste site investigations as Regulated Fill will be at Contractors' risk. Compliance with the Regulated Fill export requirements of the MoFP must be demonstrated to the Department.

PennDOT fill Forms EDD-VI and EDD-VII and any other supporting documentation shall be maintained at the District Office Waste Management File for a minimum of five years. The forms <u>are not</u> included in the Phase I, II or III reports, but may be submitted to the District Office along with the reports. The fill EDD process must be completed by the end of Final Design so that the findings may be incorporated into the PS&E package.

In instances where the Phase I report will be more than one year old at the time of construction contract letting, it is recommended that the District review its project file and perform a site reconnaissance late in Final Design in order to confirm the validity of the report's conclusions, to assure Clean Fill determinations are still valid. The District should document findings in its project file, including any significant changes in site conditions that do not necessarily alter the Phase I report's conclusions. It may be necessary to conduct additional environmental investigations if the Phase I report's conclusions are no longer valid, for example due to changes in project plans or as a result of changes in site conditions.

Some additional strategic elements of the MoFP and PennDOT policy related to highway construction include the following:

- ❒ For a project's used asphalt and concrete pavement material to be moved offsite, the PennDOT Project Manager (Design, Construction, or Maintenance) or designee will be responsible for conducting EDD. As stated above, used asphalt and concrete from highway/bridge pavement are considered Clean Fill, if fill EDD determines there is no evidence of impact by a spill or release of regulated substance. PADEP MoFP does not apply to Reclaimed Asphalt Pavement (RAP) millings for which a co-product determination has been made and which will be reused accordingly.

- ❒ It is the responsibility of the construction Contractor to make, or obtain from the supplier, an EDD determination for all non-"natural aggregate" borrow fill materials entering the construction ROW in accordance with the PADEP MoFP. The Contractor shall ensure that EDD forms are submitted and accepted by PennDOT prior to delivery of the materials to the project site. **Please note** that this requirement does not apply to "natural aggregate" (i.e. crushed rock or stone) obtained from a permitted quarry operation as these suppliers are subject to the Quality Control/Quality Assurance requirements in the approval of their aggregates.

- ❒ Used asphalt and concrete pavement materials brought onto the project ROW will be accepted as Clean Fill by PennDOT only when the materials are obtained from another PennDOT transportation project, and Form EDD-VI is completed by the contractor. This guidance does not apply to RAP to be reused as a co-product.
- ❒ Unforeseen materials within PennDOT's ROW at the construction site that are determined not to be Clean Fill will be managed contractually in accordance with Publication 408 Section 104.08, if hazardous waste, or Section 110.02.b, if residual waste (including Regulated Fill).
- ❒ In accordance with Publication 408, Section 104.06, it is the responsibility of the construction Contractor to satisfactorily remove and dispose of all existing highway structures and material which are not to remain in place or to be used in the new construction (except for materials affected by the provisions of Section 105.16, Coal or Valuable Mineral Findings).

7.4.2 HIGHWAY MAINTENANCE PROJECTS

Materials to be reused offsite from highway maintenance projects, including but not limited to ditch clearing, shoulder cutting and widening, and pipe replacement, shall be evaluated using Form EDD-VI. The visual inspection shall be performed and Form EDD-VI signed by either the County Foreman or the Assistant County Manager (ACM). The procedure for maintenance activities is as follows:

- ❒ If the visual inspection indicates or identifies a suspected release, an EDD Phase 2 Step 1 determination shall be performed. If the EDD Phase 2 Step 1 investigations find no evidence of a spill or release of regulated substances, then the material may be managed as Clean Fill. Forms EDD-VI and EDD-VII and any necessary supporting documentation shall be maintained at the District or County Office for a minimum of 5 years.
- ❒ Laboratory analysis of materials should only be conducted when the EDD Phase 1 or EDD Phase 2 Step 1 investigation identifies evidence of a spill or release. If laboratory analysis determines that Clean Fill standards have not been exceeded, then the fill may be used offsite as Clean Fill, in which case the fill recipient and PADEP shall be provided with the laboratory results, as well as a completed MoFP Form FP-001. Although not required under EDD guidelines, Form M-666 should also be completed for Maintenance projects, as applicable, in accordance with Department policy.

Writeable online versions of the EDD-VI and EDD-VII forms are available at PennDOT's Forms and Publications page at http://www.dot.state.pa.us/, indexed as forms D-1 and D-2, respectively.

Where landfill disposal of fill is anticipated within one year, if possible chemical analysis should include landfill-required analytical parameters, so that sampling and analytical testing is only conducted once.

In performing EDD for maintenance activities, it is recommended that visual inspections be performed well in advance of field activities to allow adequate time for EDD decisions and investigation or management of suspected releases and avoid rushed field decisions and unnecessary delays to planned work schedules. During advance planning of maintenance activities, a single EDD-VI form may be used for the visual inspection of a group of similar ditches and shoulders in close proximity that will all be worked on over the span of a few days by a maintenance crew. Visual inspections should be conducted on foot rather than from a moving vehicle.

In the Transportation Development Process, the completion of the Phase I may be used to meet MoFP Fill EDD requirements, and supply information to complete the EDD-VI form. Either the District or the Investigator may complete the EDD-VI form for the project file. In instances where the Phase I investigation determines that further investigation is required, the Phase II or Phase III may be used to meet EDD requirements, and the Phase II and/or Phase III data may be used to complete the EDD-VI form for the project file. The Phase II and/or Phase III data may also be used to complete form FP-001 as applicable.

REFERENCES

Federal Aviation Administration (FAA). 2017. "FAA Orders & Notices." Web. FFA.gov. United States Department of Transportation (DOT) FAA.

Federal Highway Administration (FHWA). 2006. "Guidance for Preparing and Processing Environmental and Section 4(F) Documents." Web. Environment.FHWA.dot.gov. United States Department of Transportation (DOT) FHWA.

Occupational Safety and Health Administration (OSHA). 2018. "OSHA Homepage." Web. OSHA.gov. United States Department of Labor OSHA.

Pennsylvania Department of Environmental Protection (PADEP). 2010. "Document # 258-2182-773 – Management of Fill." Web. DEPGreenport.state.pa.us. PADEP Bureau of Waste Management.

Pennsylvania Department of Transportation (PennDOT). 2018. "Forms, Publications, and Maps." Web. PennDOT.gov. PennDOT.

United States Environmental Protection Agency (EPA). 2015. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. EPA publication SW-846." Web. EPA.gov. EPA.

GLOSSARY

A

Act 2

The Land Recycling and Environmental Remediation Standards Act, often referred to as Act 2, established a framework for developing remediation standards applicable to all releases of regulated substances. It was adopted July 18, 1995.

Act 2 Medium-Specific Concentrations (MSCs)

Contaminant threshold values for soil and groundwater that remediators compare to site investigation and post-remediation soil and groundwater test results to demonstrate attainment of Act 2 remediation standards.

Aboveground Storage Tank

Storage tanks with capacity in excess of 250 gallons, in which 90% or more of the volume is stored above the ground surface.

Air Emissions

Physical, chemical or biological substance emitted into the ambient air that contains air pollutants as defined in Section 302 of the Clean Air Act.

Appropriate Inquiry

Inquiry into previous ownership and uses of a property, consistent with good commercial practice, in an effort to minimize liability. In court, a defendant must prove that steps were taken to be released from liability of a contaminated site under SARA.

Asbestos

Six naturally occurring fibrous minerals found in certain rock formations characterized by very small, fibrous shapes that can cause serious health problems when inhaled. Some of the minerals have been used in building and insulation products because of their strong noncombustible properties.

Asbestos Containing Material (ACM)

Any material containing one percent Asbestos or more.

B

Brownfields

Abandoned, idled, or under-used commercial, industrial or institutional properties where redevelopment and reuse are complicated by light to moderate contamination from hazardous substances.

C

Clean Fill

Uncontaminated, nonwater-soluble, nondecomposable inert solid material, including soil, rock, stone, dredged material, used asphalt, and brick, block or concrete from construction and demolition activities that is separate from other waste and recognizable as such.

Comprehensive Environmental Response and Liability Information System (CERCLIS)

Compilation of sites EPA has investigated or is currently investigating for a release or threatened release of hazardous substances pursuant to the Comprehensive Environmental Response, Compensation and Liability Action (CERCLA).

Contaminated Material

Solid, liquid or gaseous material that has the potential to threaten public health and/or the environment, and that may require special handling. Potentially contaminated material requires segregation from other material and must be stored in a safe, secure manner so that testing can be performed to determine type of contaminants that may be present. Contaminated material handling may require implementation of personnel protective measures involving respiratory and skin protection.

D

Decontamination

The removal of potential contaminants from employees and equipment to the extent necessary to preclude adverse health effects and the transfer of contaminants to clean areas.

Department

The Pennsylvania Department of Transportation, usually referring to the Bureau of Maintenance and Operations, Maintenance Technical Leadership Division, Strategic Environmental Management Office (Roadway/SEMP Section).

Drum

Container typically designed to hold 55 gallons of liquid material, used to store solid and liquid hazardous substances, hazardous waste, or other environmentally sensitive materials.

Due Diligence

Efforts taken by the potential future owner of a property to determine the possible environmental liability of a site. In court, a defendant must document these efforts to be released from liability under SARA.

E

Earth Disturbance

Any construction or other activity which disturbs the surface of the land including, but not limited to, excavations, embankments, depositing or storing soil, rock or earth.

Environmental Covenant

A document that restricts land use in order to support an environmental response project (usually an environmental remediation, or closure of a waste management site). Environmental covenants must be registered with the Pennsylvania Department of Environmental Protection and recording in the county. For further information see the UECA statute, 27 Pa. C.S. §§ 6501-6517, and the UECA regulations, 25 Pa. Code, Chapter 253.

Environmentally Sensitive Material

Any waste product or other material with potential to cause harm to the environment or human health in the event that a release of such material occurred.

Environmental Protection Agency (EPA)

Federal agency responsible for enforcing environmental regulations such as RCRA, CERCLA, Clean Air Act, Clean Water Act.

Experienced Personnel

A person possessing sufficient training and experience necessary to prepare and conduct the activity required to be performed, and having the ability to develop sound opinions and conclusions regarding recognized environmental conditions in connection with the property in question.

F

Facility Index System (FINDS)

List of facilities that generate regulated quantities of waste compiled from the EPA's various regulatory programs.

Feasibility Study

Evaluation of potential remedial alternatives for their ability to meet technical, public health, environmental and financial requirements.

Friable Asbestos Containing Material

Material that contains greater than one percent asbestos by weight, and can easily be crumbled or reduced to powder by crushing with hand pressure.

G

Greenfields

Land which historically has been prime farmland, open-space, and natural areas that do not have ready access to water, sewer, and infrastructure.

Groundwater

Naturally occurring water that moves through the earth's crust, usually at a depth of several feet to several hundred feet below the earth's surface.

Geophysical Techniques

Methods such as ground penetrating radar, electromagnetics, magnetometry, electrical resistivity and seismic refraction used to identify buried metal objects (such as tanks, pipelines or drums) and contaminant plumes.

H

HASP

The Health and Safety Plan (HASP) establishes the procedures for identifying or minimizing potential exposure to hazards.

Hazardous Substance

Substance defined pursuant to CERCLA.

Hazardous Waste

Waste identified by characteristics, source or specific substance as found in 25 PA Code Chapter 75, Subchapter D, and the Code of Federal Regulations (CFR) Title 40, Chapter 261. A hazardous waste may: 1) cause or significantly contribute to an increase in mortality or morbidity in either an individual or the total population; and 2) pose a substantial hazard to human health or the environment when improperly treated, stored, transported, disposed or otherwise mismanaged.

Historic Fill

As defined in PADEP's Management of Fill Policy, August 7, 2010, materials used to bring an area to grade prior to 1988 that is a conglomeration of soil and residuals, such ashes from the residential burning of wood and coal, incinerator ash, coal ash, slag, dredged material and construction and demolition waste. Excludes Current Generation Slag as defined by Act 7 of 2018.

I

Illicit Discharge

Any discharge into the highway storm sewer system that is not entirely composed of stormwater, with the exception of discharges specified in Publication 23, Chapter 8 such as irrigation drainage, firefighting discharges, potable water, etc.

Indemnification

Written promise that a party will hold another party harmless for its liability to a third party; frequently used when a problem is suspected but not confirmed.

Invasive Investigation Techniques

Techniques for characterizing nature and degree of contamination which involve altering the physical condition or appearance of a site; these include soil gas analyses, soil borings, monitor well drilling, test pitting and excavation.

L

Land Recycling and Environmental Remediation Standards Act

Often referred to as Act 2, this act established a framework for developing remediation standards applicable to all releases of regulated substances. It was adopted July 18, 1995.

M

Manifest

Specific shipping document used by the generator of hazardous wastes to track waste from generation source to treatment or disposal site ("cradle to grave" tracking).

Material Safety Data Sheet (MSDS)

Written material regarding a specific hazardous chemical including information such as hazards, personnel protective equipment and emergency procedures - required by Right-To-Know regulations.

N

National Priority List (NPL)

EPA's database of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund program.

National Spill Report

Compilation of reported releases of oil and hazardous substances. Contains information from spill records made to Federal authorities including EPA, US Coast Guard, National Response Center and Federal Department of Transportation.

Natural Resources

Land, fish, wildlife, drinking water supplies and other assets belonging to, managed by or otherwise controlled by the Federal, state or local government.

O

Occupational Safety and Health Administration (OSHA)

Federal agency responsible for enforcing worker health and safety regulations.

P

Pennsylvania Department of Environmental Protection (PADEP)

State regulatory agency responsible for enforcing environmental regulations.

Pennsylvania Priority List (PAPL)

A priority list of sites with toxic releases or threatened toxic releases. PAPL is used to identify sites which need further study and/or remedial response decisions to address threats to the public health, safety or the environment.

Potentially Responsible Party

Party who may be liable for remediation costs, damages to natural resources and/or costs for health assessments.

Potential Waste Site

Property used for, but not limited to: gas stations, dry cleaners, pesticide application companies, paint companies, machine shops, auto repair/maintenance facilities, chemical manufacturing facilities, dump sites, land fills, waste recycling and processing facilities (including land application), transportation related operations (railroad, truck terminals, etc.), junk/salvage yards, metal plating facilities, printing facilities, photo processing facilities, analytical laboratories, nursery/greenhouse operations, electronics facilities, manufacturing facilities, and properties that border such operations.

Practically Reviewable Records

Records/files which are readily available and pertinent to the investigation at hand.

Q

Qualified Consultant

Consultant that has proven qualifications, necessary expertise and adequate personnel to effectively perform required work.

R

Regulated Fill

Soil, rock, stone, dredged material, used asphalt, historic fill, and brick, block or concrete from construction and demolition activities that is separate from other waste and recognizable as such, that has been affected by a spill or release of a regulated substance, such the concentrations of regulated substances exceed the values in Table FP-1a and b (a.k.a. the Clean Fill standards). Note: PADEP's position on its written guidance is that Historic Fill may not be considered Clean Fill, even if contaminant levels do not exceed any Table FP-1a and b values.

Remediation

Cleanup of environmentally sensitive material. Costs for studies, relocation, management, overhead and other expenses must also be considered in the remediation process.

Residual Waste

Non-hazardous garbage, refuse or other discarded material or waste including, solid, liquid, semi-solid or contained gaseous materials resulting from industrial, mining and/or agricultural operations and sludge from an industrial, mining or agricultural water supply treatment facility, wastewater treatment facility or air pollution control facility.

Resource Conservation and Recovery Act (RCRA) Facilities Database

The EPA's compilation of reporting facilities that generate, store, treat, transport or dispose of hazardous waste.

Right-To-Know Regulations

A variety of Federal and State regulations that provide chemical hazard information to workers, not to be confused with the Right-To-Know Law that requires state government agencies to provide public access to certain agency records upon request.

S

Storage Tank and Spill Prevention Act (U.S.)

Regulates activities pertaining to owners of certain classes of tanks, including used motor oil, waste oil and hazardous waste, and owners of aboveground storage tanks. Act 34, adopted July 9, 1996, amended definitions of certain types of storage tanks/storage facilities.

Storage Tank & Spill Prevention Act

Also known as Act 32, it requires the Department of Environmental Protection to adopt regulations which establish release confirmation, release reporting, and corrective action requirements for owners and operators of registered aboveground and underground storage tanks and other responsible parties.

Superfund Site

Superfund is the commonly used name for CERCLA. It ensures site cleanup by responsible parties or through government funding. High priority sites designated by the EPA for remediation under CERCLA are known as Superfund sites.

Synthetic Precipitation Leaching Procedure (SPLP)

Method 1312 is designed to determine the mobility of both organic and inorganic analytes present in liquids, soils, and wastes. It is designed to simulate normal atmospheric leaching conditions, as opposed to the TCLP. The TCLP analysis was designed to characterize landfill leachate toxicity, which is generated under anaerobic conditions.

T

TEA-21

Transportation Equity Act for the 21st Century

Toxicity Characteristic Leaching Procedure (TCLP)

Method 1311 is designed to determine the mobility of both organic and inorganic analytes present in liquids, soils, and wastes. It is designed to simulate leaching conditions in landfills. It is the approved regulatory analytical method for determining whether a material is hazardous, for Characteristic Toxicity.

U

Underground Storage Tank

Any tank, including underground piping connected to the tank, which was used to store hazardous substances, including petroleum. Ten percent or more of the tank volume, including piping, must be located beneath the ground surface.

V

Vadose Zone

The unsaturated soil zone above the water table.

Volatile Organic Vapors

Vapors from substances containing carbon, hydrogen and oxygen atoms, characterized by relatively low vapor pressures at ambient air temperature.

W

Waste Site

Property, including structures on a property, which has been impacted by hazardous or environmentally sensitive materials.

Water Table

The surface of groundwater at which the water pressure equals atmospheric pressure.

PUBLICATION 281
APPENDIX A

PHASE I WASTE SITE INVESTIGATION CHECKLIST

PUBLICATION 281 RECOMMENDED PHASE I CHECKLIST		
RECORDS REVIEW		
Item	**Date Completed/ Reviewed**	**Initials**
Federal NPL site list		
Facilities Index System (FINDS)		
Federal CERCLIS list		
Federal RCRA TSD facilities list (optional)		
Federal RCRA generators list (optional)		
Federal ERNS list (optional)		
PA Priority list		
PA Operating Municipal Waste Landfills list		
PA Solid Waste Inventory		
PA Hazardous Waste Inventory		
DEP registered UST list (optional)		
DEP leaking UST list		
Regional DEP site records		
• Contaminated sites		
• Remediation projects (former, ongoing and planned)		
• Emergency release reports (SARA § 304)		
• Well and groundwater contamination records		
Physical setting sources		
• USGS 7.5 minute topographical maps		
• Soil survey		
• Groundwater maps (optional)		
• Bedrock geology maps (optional)		
• Surficial geology maps (optional)		

RECORDS REVIEW (continued)		
Item	**Date Completed/ Reviewed**	**Initials**
Historical use information		
• Aerial/historic photographs		
• Fire insurance maps (e.g. Sanborn Maps)		
• Property tax files		
• Recorded land titles		
• Environmental Covenants		
• Local street directories		
• Local building department records		
• Zoning/land use records		
RECORDS		
General site setting		
• Present site usage		
• Past site usage		
• Adjoining properties		
• Surrounding area utilization		
Geologic, hydrogeologic, hydrologic and topographical conditions		
Structures and installations		
Roadways and rights-of-way		
Observations		
• Hazardous substances or petroleum products		
• Storage tanks (both USTs and ASTs)		
• Odors		
• Pools of liquid		

Site Reconnaissance (continued)		
Item	**Date Completed/ Reviewed**	**Initials**
• Drums/containers (check labels, if any)		
• Asbestos, PCBs or Lead		
• Stains or corrosion on soils or pavement		
• Stressed vegetation		
• Solid waste		
• Drains, sumps, pits, ponds or lagoons		
• Wastewater or other discharge, e.g. illicit discharge		
• Wells or septic systems		
• Airborne emissions		
Interviews		
Owners, occupants, neighbors		
Regional officials		
• US EPA Region III		
• DEP Waste Management Program		
• DEP Water Quality - Storage Tank Program		
• Emergency response/HAZMAT		
• Local Sewer Authority (optional)		
• Fire Department (optional)		
• Zoning officer (optional)		
• Police Department (optional)		
• Building inspector (optional)		
• Historical Society (optional)		
• Municipal officials (optional)		
• PennDOT employees (optional)		

Site Sketch		
Item	**Date Completed/ Reviewed**	**Initials**
R.O.W. (proposed or actual)		
Structures and installations		
Utilities		
Storage tanks and associated facilities (pumps, pipes, etc.)		
Drains, sumps, pits, ponds and lagoons		
Geologic, hydrogeologic, hydrologic and topographical		
conditions (optional)		
Roads (optional)		
Stained areas (optional)		
Stressed vegetation (optional)		
Solid waste (optional)		
Wastewater or other discharge (optional)		
Wells and septic systems (optional)		

PUBLICATION 281

APPENDIX B

EXAMPLE SPECIAL PROVISIONS FOR UNDERGROUND STORAGE TANK (UST) REMOVALS

EXAMPLE SPECIAL PROVISIONS FOR UNDERGROUND STORAGE TANK REMOVALS

Scope of Work: (This should be incorporated into the Waste Management Plan (WMP), if one is prepared. If only waste management-related Special Provisions are being prepared, thisinformation should be indicated under the Description section of the special item.)

During environmental investigations for this project, underground storage tanks (UST) were suspected to have been identified on the (site id) property. It is suspected that there are potentially 1-3 USTs in-place. The attached map indicates the approximate area where the tank(s) are suspected to be located. **Insert investigation findings and results, or reference where it can be found.**

The Contractor shall initially conduct a test pit operation to verify the presence or absence of the suspected USTs. If any USTs are found, the Contractor shall provide all labor, materials, tools, equipment, and incidentals for the removal of the tank(s) and appurtenances. All tank handling activities must be conducted by a DEP Certified Tank Remover.

Contractor shall use a licensed transporter, certified to transport the types of wastes to be disposed of, for all off-site transportation of wastes generated. A copy of the transporter's license shall be provided to the designated PennDOT Project Engineer prior to the wastes leaving the site.

The contractor shall prepare and implement their company health and safety plan, in accordance with the OSHA 1910.120 regulations, when conducting tank removal services under this contract. The contractor shall provide a copy of the site-specific health & safety plan upon request by PennDOT. The contractor's corporate and site-specific health & safety plans are considered incidental to the contract and shall be provided at no extra cost.

Item 9000-xxx1: UST Removal

Description: The tank removal services to be provided by the Contractor include the excavation and removal of the storage tanks and appurtenances, the transportation and disposal of the storage tank & appurtenances, the tank contents, and localized petroleum contaminated media and debris (See Definition). If PennDOT determines that removal of additional contamination is desirable and/or required, the contractor will be paid for this additional excavation in accordance with Special Provision Item 9000-XXXX. The storage tank hold down pad, if present, may remain in-place (where appropriate).

The Contractor shall prepare, if applicable, the DEP closure report, and shall submit two (2) copies to the PennDOT designated representative.

All excavated materials that are deemed to be contaminated shall be segregated from non- or less contaminated debris, to minimize all required off-site disposal. All contaminated soil must be properly stored, while awaiting sample analysis results. Contractor shall remove from the site, all contaminated soil requiring off-site treatment or disposal within thirty (30) days of receipt of sample analysis results.

The Contractor shall provide barricades around any open excavations that will be unoccupied for any length of time. Contractor shall also take necessary steps to prevent precipitation run-off from entering the excavation. All water entering excavations, due to the contractor's inadequate securing of the excavation from run-off, shall be pumped and treated at the contractor's expense.

All waste testing and analysis required by Federal and State laws for the proper disposal of wastes, shall be the responsibility of the Contractor, and shall be included in the disposal unit cost (Items 5 & 6).

Construction: In accordance with the applicable sections of Publication 408M and the API Recommended Practice 1604: Removal and disposal of used underground storage tanks. For the closure report, supply color photographs of the removed tanks, piping, and of the excavation.

Measurement & Payment: Lump Sum, Per Tank, or Per Site, etc.

Item 9000-xxx2: Soil Sampling & Testing

Description: This item includes the testing of tank excavation soils and excavated soils required for acceptable closure of regulated underground storage tanks in the determination of whether the excavation soils and staged soils meet or exceed regulatory requirements.

Construction: In accordance with the DEP Storage Tank Closure Guidance, 4/1/98.

Measurement & Payment:

a. **EPA Method 5035/8021B** to include the following compounds- BTEX; Isopropyl benzene; 1,2 Dibromoethane (EDB); 1, 2-Dichloroethane (EDC), and Naphthalene $_____ each

b. **EPA Method 8270C/8310** to include the following compounds- Benzo (a) anthracene; Benzo (a) pyrene; Benzo (a) fluoranthene; Fluorene; Indeno(1,2,3-cd) pyrene; Phenanthrene; and Benzo(g,h,i) perylene $_____ each

c. TRPH (**EPA Methods 3560, 8440, or 1664**) $_____ each

d. Lead, total (**EPA Method 7420/6010B**) $_____ each

e. Benzene, Toluene, Ethyl benzene, Xylenes (**EPA Method 5035/8021B**) $_____ each

f. MTBE (**EPA Method 5035/8260B**) $_____ each

Item 9000-xxx3: Liquid Sampling & Analysis

Description: This item is the testing of all liquids encountered in the closure of regulated or unregulated underground storage tanks.

Construction: In accordance with the DEP Storage Tank Closure Guidance, 4/1/98.

Measurement & Payment:

a. **EPA Method 5030B/8021B** to include the following compounds- BTEX; 1,2- Dibromoethane (EDB); 1,2-Dichloroethane (EDC), and Naphthalene $____ each

b. **EPA Method 8021A** to include the following compounds- BTEX; 1,2-Dibromoethane (EDB); 1,2-Dichloroethane (EDC), and Naphthalene $____ each

c. Lead, dissolved (**EPA Method 6020/7421**) (leaded fuel tanks) $____ each

d. Benzene, Toluene, Ethyl benzene, Xylenes (**EPA Method 5030B/8021A**) $____ each

e. MTBE (**EPA Method 8021A**) (unleaded fuel tanks) $____ each

Item 9000-xxx4: Disposal of contaminated soil and debris

Description: This item is for the transportation and disposal of contaminated media & debris, at a facilitypermitted to accept the wastes to be disposed of. Waste transporter must possess applicable transporter's permit(s) for the appropriate waste type.

Construction: Waste disposal price shall include the loading, transportation, landfill waste analysis & sample collection, and waste disposal fee. Shall also include all necessary materials and equipment for temporary storage of material, while awaiting disposal facility approvals. (Note: Landfill waste analysis cost, may require a separate bid item, particularly when waste types are unknown.)

Measurement & Payment: Per Ton, or Per Cubic Yard

Item 9000-xxx5: Disposal of contaminated liquids

Description: This item is for the disposal of contaminated liquids required to be removed from the excavation to facilitate removal of the tank(s) and appurtenances, at a facility permitted to accept the wastes to be disposed of.

Construction: Contaminated liquid disposal price shall include the pumping, containerization, transportation, treatment facility waste analysis & sample collection, and waste disposal fee.

Measurement & Payment: Per Gallon

Item 9000-xxx6: Additional Excavation:

Description: This item covers the removal of additional contaminated soil, as directed by PennDOT, or required by law to affect a clean closure, if applicable.

Construction: This price shall include excavation equipment, equipment operator, and all necessary materials required for the excavation, temporary storage of contaminated soil beyond the standard tank removal area.

Measurement & Payment: Per Cubic Yard or Per Hour

Item 9000-xxx7: Disposal of Tank Contents

Description: This item is for the disposal of liquids and sludge remaining in the tank(s), exceeding 2.54 centimeters in thickness.

Construction: Product disposal price should include the pumping, containerization, transportation, sample collection and treatment facility waste analysis and waste disposal fee.

Measurement & Payment: Gallon. If product is contaminated with groundwater, payment will be made in accordance with Item #9000-00.

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APPENDIX C

EXAMPLE WASTE MANAGEMENT PLAN DEVELOPMENT

EXAMPLE WASTE MANAGEMENT PLAN DEVELOPMENT

Preface

Waste management plans (WMPs) (See ***Section 7.2*** for additional information) are prepared by the Department for incorporation into the highway project contract documents. The intent of these plans is to provide the Highway Contractor and/or their subconsultant with current site conditions and the scope of remedial actions required.

The type and extent of required remedial actions will vary from the very simple (e.g. tank removal) to extremely complex (e.g. excavation and select fill placement, or on-site soil washing). As such, waste management plans tend to very significantly depending on the circumstances associated with each project.

Therefore, what is provided in this Appendix is a recommended Table of Contents for a Waste Management Plan developed for a specific Department project. Within the Table of Contents, it is indicated which items are usually required (✓), which are recommended for inclusion (◆), and those that are optional (➢) for preparation of a WMP.

It should be noted that some items which are indicated as optional, may have additional items listed under them in subheadings. These subheadings may be listed as required items. The subheading items are only required if the original item, indicated as optional, is required for the individual project.

To ensure that all issues are properly addressed, it is recommended that the Bureau of Environmental Quality be consulted during the development of a Waste Management Plan.

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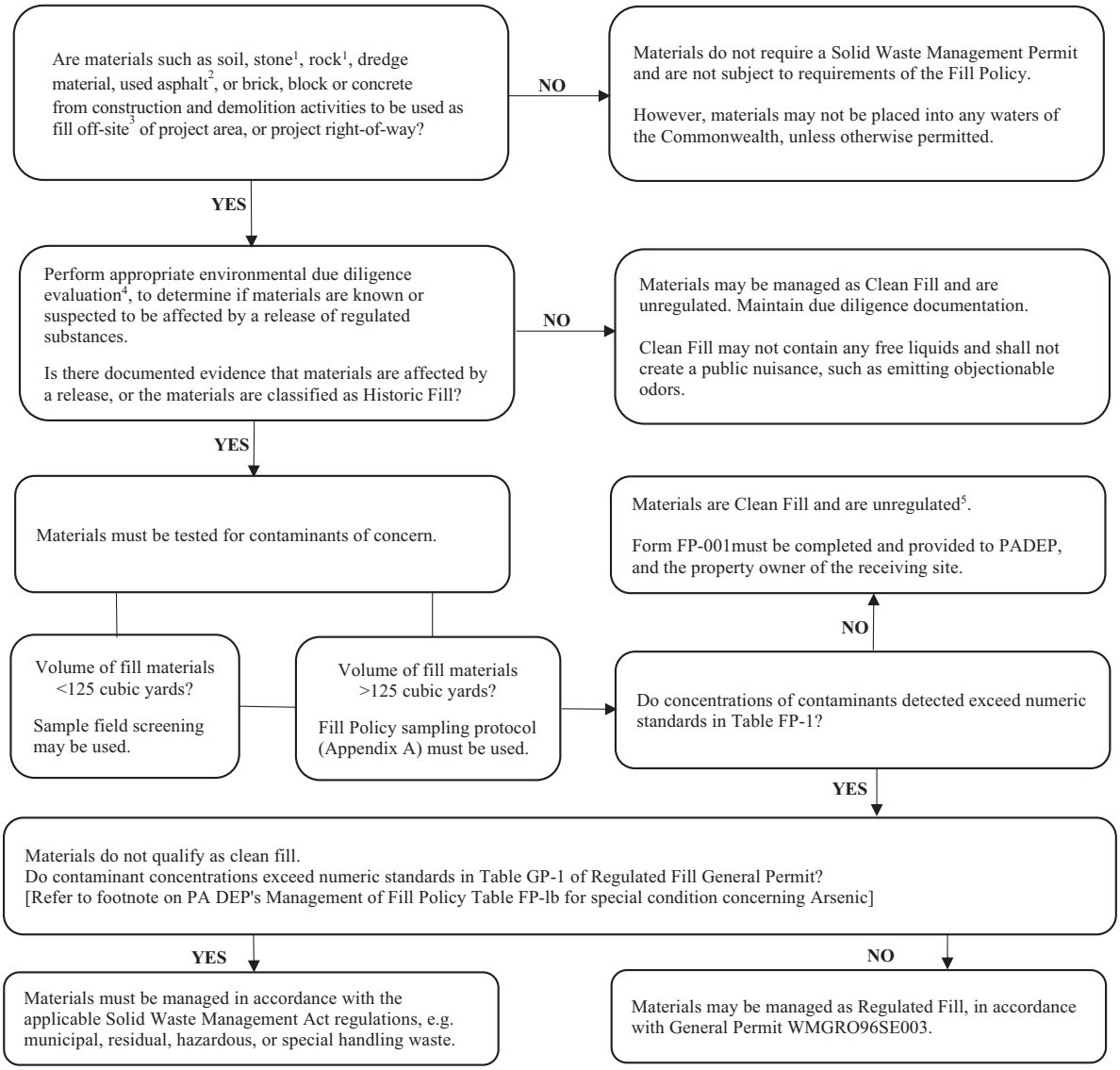
APPENDIX D
MANAGEMENT OF FILL

- PennDOT Management of Fill Flowchart
- DEP Document No. 563-2000-201, Use of Reclamation Fill at Active Noncoal Site

PennDOT Management of Fill Flow Chart

Asphalt concrete which contains naturally occurring regulated substances and that may exceed the Clean Fill levels, and cement concrete from highways & bridges are considered Clean Fill, without the need for testing, unless knowledge of a spill or release has occurred.



1. The Fill Policy does not apply to stone and rock brought on-site from a PennDOT Bulletin 14 Approved Aggregate supplier.
2. Bituminous asphalt pavement [> 1" nominal diameter pieces] that has been excavated without the use of a milling machine. Millings (i.e. RAP) and mixture of RAP and clean fill may be managed under Industry-Wide Co-product #1 Reclaimed Asphalt Pavement.
3. Clean Fill Policy also applies to fill brought onto a project area or project right-of-way.
4. Environmental Due Diligence- Investigation techniques that may include, but not limited to, visual inspections; electronic database searches; property ownership/historic use; Sanborn maps; aerial photos; environmental questionnaires/audits; and sampling and analysis.
5. Excluding material identified as Historic Fill. Historic Fill will not qualify as Clean Fill due to its composition, possible odor and age, even if regulated constituent concentrations meet Table FP-1 Clean Fill criteria.

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Mining Programs

DOCUMENT NUMBER: 563-2000-301

TITLE: Use of Reclamation Fill at Active Noncoal Sites

EFFECTIVE DATE: December 19, 2015

AUTHORITY: Solid Waste Management Act (35 P.S. §§ 6018.101 et seq.), Noncoal Surface Mining Conservation and Reclamation Act (52 P.S. §§ 3301 et seq.), Clean Streams Law (35 P.S. §§ 691.1 et seq.), Land Recycling and Environmental Remediation Standards Act (35 P.S. §§ 6026.101 et seq.), and Sections 1915-A and 1917-A of the Administrative Code (71 P.S. §§ 510-15 and 17).

POLICY: The Department of Environmental Protection (DEP or Department) may permit the use of certain fill materials obtained from an off-site source for use by the operator in the reclamation of active noncoal mine sites if the fill material qualifies as Reclamation Fill in accordance with this guidance, and the use of Reclamation Fill Material is expressly authorized by the mining permit.

PURPOSE: This policy establishes the Department's procedures and standards for using Reclamation Fill for reclamation at active permitted noncoal mine sites.

APPLICABILITY: This policy applies to the use of Reclamation Fill for reclamation purposes at active permitted noncoal mine sites.

DISCLAIMER: The policies and procedures outlined in this guidance document are intended to supplement existing requirements. Nothing in the policies or procedures will affect regulatory requirements.

The policies and procedures herein are not an adjudication or a regulation. There is no intent on the part of the Department to give these rules that weight or deference. This document establishes the framework, within which DEP will exercise its administrative discretion in the future. DEP reserves the discretion to deviate from this policy statement if circumstances warrant.

PAGE LENGTH: 20 pages

DEFINITIONS

Environmental due diligence - Investigative techniques, including, but not limited to, visual property inspections, electronic database searches, review of ownership and use history of property, Sanborn maps, environmental questionnaires, transaction screens, analytical testing, environmental assessments and audits.

Incidental Asphalt - Uncontaminated asphalt that is encountered in small amounts that cannot be readily separated for recycling, or the quantities are so small as to make recycling impractical. Incidental asphalt cannot constitute the bulk of the material (over 50%) in any truck or overall from a source.

Incidental Volumes - Insignificant quantities of reclamation fill that will not alter the reclamation plan or land use. The quantities depend on the size of the operation.

Reclamation Fill - Soil, rock, stone, incidental asphalt, or unpainted brick, block or concrete from construction and demolition activities imported to a site for reclamation purposes, where a demonstration has been made that the material is uncontaminated, non-water-soluble, non-decomposable, inert and recognizable as such. — Uncontaminated‖ means that the fill material does not contain any of the materials listed below or regulated substances in concentrations exceeding the concentration levels specified in Appendix A. The following materials are specifically excluded from this definition and may not be considered as reclamation fill under any circumstances:

(a) Tile, glass, plaster, pipe, wire, shingles, wallboard or other construction material not in the above definition.

(b) Discarded home or medical items and trash.

(c) Unused asphalt, such as that left over from construction jobs and cleaning up around asphalt plants.

(d) Soil from industrial or commercial sites with known spill events or contaminant storage, sites with underground storage tanks, Act 2 clean-up sites, and superfund sites unless the Department approves use after characterization of the site.

(e) Painted building materials or other materials with rebar or other metal protruding greater than 2 inches.

(f) Materials that test positive for organic vapors.

(g) Fill that may produce public nuisances (for example: objectionable odors) to users of the receiving property or adjacent properties.

(h) Materials that contain free liquids based on visual inspection.

(i) Contaminated materials mixed with uncontaminated material to improve the overall quality.

(j) Materials that exceed the mine site background radiation.

(k) Any other substance that the Department determines may pose an environmental, safety or health risk.

BACKGROUND

On August 7, 2010, the Department's Bureau of Waste Management finalized Technical Guidance Document 258-2182-773, Management of Fill. The Waste Management Technical Guidance Document provides procedures for determining whether a material constitutes —clean fill‖ or —regulated fill‖ and for proper management of clean and regulated fill. However, that document expressly *does not apply to mine land reclamation activities subject to a mining permit.* This guidance, Use of Reclamation Fill at Active Noncoal Sites, was prompted by industry requests to standardize a process for importing fill for reclamation use at noncoal quarry sites.

This guidance describes the standard criteria for approving reclamation fill at an active noncoal site, what material is appropriate, for which sites it can be used, and how it may be used. It provides for a default approach that is generally acceptable to the Department for meeting the requirements of Chapter 77, Section 77.126. Many of the guidelines discussed are actively applied under Pennsylvania's noncoal mining program and have successfully prevented pollution and resulted in improved reclamation.

Alternatives to the guidelines herein will be considered by the Department if the methods are as effective as or more effective than the methods described herein. If an applicant chooses to deviate from the guidance, the applicant should contact the Department for approval. Failure to follow these guidelines or to obtain approval for an alternate approach may result in denial of an application to beneficially use reclamation fill or a significant delay in review. All permitting decisions are site-specific and depend on factors such as local geology, hydrologic setting, resources to be protected and reclamation goals. The ultimate decision as to whether an approval is granted for each mine site to incorporate reclamation fill depends on whether the site proposal and the material comply with regulatory requirements. Please note that conforming with the standards of this guidance does not guarantee approval.

A permittee is required to comply with 25 Pa. Code §§ 77.462 and 77.591-77.595 regarding reclamation and the minimum requirements for slopes WITHOUT the use of imported material. Reclamation fill is to be used to enhance the minimum reclamation and can also be used to reclaim pre-act areas that the permittee is not obliged to reclaim to make for an overall improved result for future land uses. Reclamation fill may be considered in order to achieve minimal reclamation requirements in rare cases, particularly with regards to safety, such as to create a safe slope that cannot be achieved by conventional means.

STANDARD CRITERIA FOR APPROVAL

For a noncoal mining permit to be issued, the applicant must demonstrate compliance with all applicable regulatory requirements including the criteria for permit approval as specified in 25 Pa. Code Chapter 77 (in particular, § 77.126). Two specific criteria are pertinent to the reclamation fill process. They are:

1. The applicant has demonstrated that the mining activities can be accomplished as required under the operation and reclamation plan contained in the application.

and

2. The applicant has demonstrated that there is no presumptive evidence of potential pollution of the waters of this Commonwealth.

Noncoal mining permits are issued with approved reclamation plans with a designated post-mining land use (§ 77.462). **The fill placement should be in accordance and consistent with the reclamation plan.** Existing overburden MUST be used from the site for reclamation purposes, not sold. That is, importation of fill material will not be allowed if usable excess overburden is removed from the site (see Final Slopes, § 77.594).

The mining regulations do not address large-scale importation of material to the site to use in reclamation. These facilities are permitted as mines, not as disposal sites. The operator should demonstrate that the imported material can enhance reclamation. That is, under § 77.462(b)(2)(iii)(B)(I)(-d-), the operator must demonstrate that the land will be restored to ―a condition of supporting uses equal to or higher and better than the premining uses.‖ Consequently, in cases where the importation of reclamation fill negatively impacts site restoration by extending the reclamation timeline, ideally, the applicant will demonstrate that the use of reclamation fill will likely result in a significant enhancement to the final reclamation grade.

Because mine pits can accommodate large volumes of fill material, the Department considers the cumulative impacts of the use of imported fill, the quality of the materials, and the potential for contamination of nearby groundwater and surface water resources in order to assure compliance with § 77.126. In order to prevent contamination, the site operator must provide assurances, chemical tests, and other evidence as needed to document fill quality, and needs to conduct monitoring adequate to demonstrate ongoing compliance with environmental statutes and Department regulations. The site operator may also be required to update geologic and hydrologic information in order to completely characterize water flow and potential pollution pathways. This may involve additional tests or studies, dependent upon local geological characteristics and water uses.

Because of these criteria, the Department recommends any site operator planning to add reclamation fill as part of the reclamation plan to contact the Department to schedule a meeting to discuss the proposal at least six months in advance of an application submittal to the Department.

STANDARD PROCESS OF APPROVAL

There are two forms of approval for reclamation fill which are dependent upon the volumes of material imported to the site. ―Incidental volumes‖ are minor amounts of material that may be accommodated on site. The larger volume category, ―reclamation volumes,‖ is for those amounts that significantly affect onsite reclamation. As such, the approval process for the latter is more involved.

<u>Incidental volumes</u>

To be considered incidental, the amount of material should not exceed 3,000 cubic yards per year per permit site. Small noncoal permit sites (77.108) are limited to no more than 125 tons of material (1 cubic yard is approximately equivalent to 1.8 tons) per year.

Any request for incidental volumes from any source must be made in writing and will, in most instances, be considered a minor permit revision [25 Pa. Code §§ 77.104; 77.141] which does not require public notice unless otherwise determined by the Department. There is no specific application form for this

request. The request should include a description of the source of the material, a demonstration and assurance that the material meets the definition of reclamation fill, volumes to be used, a timetable of use, identification of the area where the material will be placed and how it will be received and placed onsite. A signed affidavit attesting to the requirement that proper environmental due diligence was completed and a signature of approval from the mine site permittee and landowner to accept this material is required [25 Pa. Code §§ 77.126(a)(3); 77.462(b)(2)(iii)(B)(I)(-c-)]. (Form 5600-FM-BMP0478 can be used.)

The material needs to be placed in a manner consistent with the approved reclamation plan and not stored in piles on site for later incorporation or for other uses offsite. It should not be placed below the groundwater table or in standing water. Because of the smaller volumes and placement above the water table, mine sites receiving incidental volumes of reclamation fill will typically be assigned less stringent testing requirements than sites receiving larger quantities of reclamation fill. However, a Source Documentation Record, form 5600-FM-BMP0145, needs to be submitted for each source brought to the site.

Reclamation volumes

Approval to import reclamation fill for an active noncoal mine site has two-parts: a site approval and a source approval. The site approval includes a thorough site characterization and integrated reclamation plan. Much of this information likely exists in the permit files if the permit was recently issued or revised. However, supplemental information may be necessary as part of the reclamation fill request. If site approval is granted, then each source must be approved for use at that site to assure compliance with 25 Pa. Code § 77.126(a)(3). Source approval will, in almost all cases, be a shorter process than the site approval provided all necessary information is submitted by the operator.

Site approval

This is an approval authorized through the noncoal mining permit to allow for reclamation fill to be used at the particular site, and as such, verbal authority or other records such as inspection reports are not acceptable.

1. Use of reclamation fill should be expressly authorized by the mining permit. Reclamation fill will not be authorized under a general permit for mining (25 Pa. Code 77 Subchapter J). Use of reclamation fill will likely not be considered under a new permit application—where mining has not yet occurred—unless the proposed use applies to reclamation of existing abandoned mine lands. Because importation of fill material constitutes a change in the reclamation plan, an existing permit must typically undergo a major permit revision to authorize its use (25 Pa. Code §§ 77.101; 77.103; 77.104). This requires public notice which must also note if the final land use is being changed in accordance with reclamation fill use. [Example: —The approved final land use is being changed from —x‖ to —y‖ with this revision.‖]

2. Landowner consent to import reclamation fill must accompany the request for authorization [25 Pa. Code § 77.462]. See Appendix B.

3. The permittee should demonstrate, to the extent possible, that the use of reclamation fill material will enhance reclamation. This can be accomplished by citing maps, plans and appropriate permit modules (see item 5).

4. An approved groundwater (and possibly surface water) monitoring plan is needed unless the applicant can demonstrate that the material will be placed in such a way that it will not come in contact with groundwater or be subject to offsite runoff that may potentially contaminate surface waters. The sampling plan should include the location of existing or proposed monitoring wells or surface water sampling points, details of wells, sampling schedule and background data collected. For placement below the groundwater table, hydrologic characterization, a groundwater monitoring plan, and demonstrations related to protection of hydrologic balance will be required [25 Pa. Code § 77.457].

5. For an existing permit, all appropriate permit application sections must be updated or completed to reflect the use of the reclamation fill. These sections include modules for the following: erosion and sedimentation plan, hydrology, operations plan, reclamation plan, final land use and vegetation, operations map and reclamation map. Also, cross sections showing intermediate grades and plan for placement must be submitted [25 Pa. Code § 77.141].

As with any major revision, the Department reserves the right to ask for additional information to update the permit information as necessary. This may include engineering assessments demonstrating that the placement of reclamation fill will not adversely impact slope stability.

The applicant should submit a request for use of reclamation fill on the appropriate DEP permit application modules supplemented with maps, plans, reports and addendums to fully characterize the site conditions, reclamation plans, potential pollution, best management practices to be used, timetables and final configurations.

Placement below the groundwater table

To obtain approval for use of a reclamation fill source below the final groundwater elevation, the applicant must provide the following [25 Pa. Code §§ 77.457; 77.126]:

1. Hydrologic characterization of the site and the surrounding area including updating information via the most recent version of permit application modules 7: Geology and 8: Hydrology along with map Exhibits in Module 6, 9 and 18;

2. Groundwater monitoring plan;

3. Demonstration that the placement of material will be done in a way to minimize disturbance to the hydrologic balance [25 Pa. Code § 77.521].

To demonstrate that the use of reclamation fill is not causing pollution, the mine site permittee will be required to submit a groundwater monitoring plan. Wells or surface water sampling points are established in the application and installed prior to commencing placement of reclamation fill. In order to characterize the site, the wells must be properly constructed and finished at the proper depth and locations. Background samples from these points must also be submitted prior to commencing placement.

Background sampling includes, at a minimum, those parameters listed in Appendix A Table 1. No less than six monthly samples should be submitted in support of the reclamation fill permit request. The sample results should not be older than two years. Use of reclamation fill should not commence until the background sampling is completed to the Department's satisfaction. For example, any problematic

sample results should be addressed and resolved prior to reclamation fill use to assure environmental protection.

Groundwater monitoring parameters should include those constituents shown in Appendix A Table 1. The operator is free to test for additional parameters and to submit these to the Department for added documentation. Samples ought to be taken at least on a quarterly basis and continued for a period of at least 12 months (quarterly) following completion of the reclamation.

Use of the fill will be authorized through a noncoal surface mining permit and appropriate conditions for use will be included.

Source approval

In general, the greater the volume coming from a source, the greater the degree of evaluation for approval is needed. That is, for small sources (those with volumes of 3,000 cubic yards or less), preapproval by the Department is not necessary as long as the permittee provides suitable due diligence and notification to the Department. For a source of greater volume, testing and preapproval by the Department will likely be required.

Material that has been impacted by a spill or release which exceeds applicable standards is not suitable for use at a mine site. To use the uncontaminated material on a site that has been impacted by spills and/or releases, the applicant must provide a characterization of the spill area and indicate how materials will be properly separated with only suitable material sent for mine reclamation.

The process of approval of each source of fill includes the following steps:

1. Environmental due diligence and Self Certification by permittee (see section below);
2. Material Testing as outlined in this document;
3. Review by Department District Mining Office staff and authorization for those sources requiring preapproval.

After approval, suitability of the fill is monitored by periodic testing of the material at the source and/or mine site.

Permittee Responsibility

The mine site permittee assumes the primary responsibility for what is taken in and used on a permitted mine site. If an environmental problem is identified, the permittee should perform the necessary investigation and remediation. If remediation is not undertaken, the permittee risks bond forfeiture related to the site and revocation of its mining license related to all the permittee's sites [25 Pa. Code § 77.242(g)(1)(iii)].

The permittee is responsible for obtaining the necessary approvals as outlined in this guidance and in conjunction with the application process undertaken through the District Mining Office in the jurisdiction where the mine site is located. As part of the approval, the permittee certifies under penalty of law that the material being brought into the site, according to the best available information, meets the

conditions imposed by the issued permit. The permittee is responsible for following best management practices and permit conditions related to operations, record keeping, monitoring and reporting.

DUE DILIGENCE AND SELF CERTIFICATION

Due diligence refers to the review of historical and recent uses of a property to determine if the material that is to be repurposed as reclamation fill has been subject to spills or releases or other means of potential contamination by regulated substances and provides assurance that the reclamation fill is of acceptable quality and does not contain contaminants with the potential to cause pollution. A qualified and experienced environmental professional should be making this determination. The due diligence process includes site inspection, review of historical records, review of regulatory databases and interviews with people familiar with the property as described in the definition for environmental due diligence.

Often, the due diligence includes screening of the material—a process in which random or targeted samples are tested for typical inorganic and organic contaminants. This provides an initial indication if and where contamination is present. A typical screening list is included as Appendix C: Screening Parameter List. However, testing should include any parameters that are suspected to be present based on the historical review and records.

Because the ultimate responsibility for any contamination resides with the mine site permittee, the permittee undertakes a process whereby it attests that proper due diligence and screening has been carried out to demonstrate that the material to be used for reclamation fill meets the definition in this document and is suitable for the intended use. That is, there is no evidence that it will cause pollution and that the use of reclamation fill will likely enhance reclamation on the site. A Self-Certification form (5600-FM-BMP0478) provided by the Department is to be completed by the applicant for each source request.

To apply for approval for any source, the mine operator completes the Self-Certification form. As part of this form, the applicant provides a summary of the due diligence process and sampling results that were reviewed to make the determination for self-certification. This sampling data should be in a spreadsheet format. All supporting data and documents, including lab sheets and reports, should be provided on portable digital format (CD, DVD, removable drive, etc.) with the source approval request. If adequate and correct information is not provided within the summary of the self-certification process for Department review, the Department may return the request unapproved.

The requirements for all digital forms of data can be waived for incidental volumes of fill, but documentation of due diligence should still be provided. Because of the low volumes in cases of incidental fill and for small sources (3,000 cubic yards or less), due diligence requirements may be lessened. The operator is advised to consult with the District Mining Office regarding the extent of due diligence that will be adequate for approval [25 Pa. Code § 77.126].

The Department will provide written approval to the permittee for a specific source in order to begin importing reclamation fill from that source to the mine site.

MATERIAL TESTING

The following sections describe the procedures for adequate testing under due diligence and the limits of the material to be certified for use as reclamation fill.

Factors for determining approval

If the due diligence process identified no contamination issues, laboratory testing of the material is the next step to be completed. The applicant needs to determine the appropriate number of samples to adequately characterize the material. This testing must be described as part of the documentation presented to the Department with the source approval request. Appendix A: Sampling and Analyses for Material to be Used as Reclamation Fill provides the testing instructions [25 Pa. Code §§ 77.126; 77.532(b)].

Testing of the material must sufficiently demonstrate that the material will not cause pollution when used as reclamation fill. Materials meeting the limits as described in Appendix A, will generally be deemed suitable as reclamation fill that is presumed to not cause pollution.

If a problem is noted with a particular constituent (or constituents), the applicant can retest or reanalyze just for the constituents of concern as long as the applicant provides a rationale for the selection of constituents and provides this to the Department with the results.

POST APPROVAL TESTING AND PROCEDURES

Documentation of each load

Documentation needs to be maintained at the site to account for all imported reclamation fill material. This documentation should contain the following:

- The origin of each load,
- An estimate of the amount of material (in cubic yards) in the delivery,
- The name of the firm bringing in the material,
- Results of the visual inspection,
- Results of the organic vapor analyzer (OVA) or photo ionization detector (PID) testing, and
- If a load is refused, the reason why it was rejected for use.

Department Form 5600-FM-BMP0145 (Source Documentation Record) has been developed to record the information needed for each load. The mine operator should maintain these records for at least one (1) year on site, making them available to Department personnel upon request. In addition, the mine site operator is responsible for keeping the records for at least five years after the site has been reclaimed. In the event an unexpected pollution incident occurs, perhaps several years later, the operator may be asked to produce evidence that all material used for reclamation fill was accounted for by source, volume and quality.

Operational testing

To ensure the material continues to meet quality standards, testing during operations is essential.

A standard example of operational testing protocol is as follows:

- The mine operator visually inspects each load to assure that the materials are as described and suitable for use.
- The mine operator scans each load of proposed material with an OVA or PID.

- If the visual inspection reveals unsuitable material and/or OVA or PID testing reveals that the load does not qualify (i.e., an OVA or PID reading is significantly above background) the load is refused.
- A rejected load is promptly removed from the permitted mine site and the generator is notified.
- If more than one load from the same source triggers a rejection within a 30-day window, the mine site operator needs to notify the Department and determine a cause of the problem. Within 30 days, the operator should provide an explanation of the problem and of actions that the operator plans to undertake to prevent this issue from reoccurring.

Periodic grab samples from loads

The default frequency for pulling grab samples for testing should be **no less than one random sample every 70 truckloads** for the parameters in Appendix C: Screening Parameters. The mine site operator can suggest an alternative sampling frequency and procedure in the application request, but the Department will most likely make the determination for greater or lesser frequency based on the source and the overall volumes used. These requirements are typically stated in the permit conditions.

The mine operator should submit the chemical analysis results upon completion to the District Mining Office that has issued the permit. The Department may determine the format for submittal through forms or electronic submission but each analysis must contain proper identification of the material, a signed affidavit, and a copy of the lab sheets from the sample results [25 Pa. Code § 77.104]. As mentioned previously, because unexpected pollution problems may arise at a later date, the mine site operator is responsible for demonstrating that the material used was of acceptable quality. Therefore, a copy should be kept on file by the company for at least five years after the site has been reclaimed.

BEST MANAGEMENT PRACTICES

Upon approval for use of reclamation fill, the operator is expected to adhere to best management practices (BMPs). These include proper testing and monitoring general practices (such as sample collection, preparation and chain of custody), prompt submission and reporting to the Department (including identification of potential problems), and careful record keeping. In addition, BMPs apply to operational procedures such as handling and placement of material and regular data assessment to ensure pollution is not occurring.

Reclamation

The mining regulations (25 Pa. Code Chapter 77) indicate that fill can only be used in accordance with the reclamation plan to achieve the post-mining land use. Accordingly, reclamation fill imported to the site may not, in most instances, be stockpiled but should immediately be used for reclamation unless otherwise approved by the Department.

Upon commencement of using reclamation fill materials, the permittee should show the progress of reclamation regularly to the Department by reporting volumes of material used as reclamation fill from each source and updated reclamation grades. Reporting requirements such as representative cross-sections of the pit and instructions for reporting the total volumes and/or weight of materials used in a year will be specified in the permit conditions [25 Pa. Code § 77.131].

Water testing

To demonstrate that the use of reclamation fill is not causing pollution, the mine site permittee needs to submit a groundwater monitoring plan to be carried out during reclamation fill operations.

Wells or surface water sampling points may be established in the application and installed prior to commencing placement of reclamation fill. In order to characterize the site, the wells must be properly constructed and finished at the proper depth and locations. Background samples from these points must also be submitted prior to commencing placement. Department approved sampling protocols should be followed in order to produce reliable data.

Background sampling should include, at a minimum, those parameters listed in Appendix A Table 1. No less than six monthly samples ought to be collected and analyzed prior to approval for placement of reclamation fill material at the mine site.

Groundwater monitoring at the mine site should include, at a minimum, those constituents shown in Appendix A Table 1. Samples ought to be submitted to the District Mining Office that issued the mining permit on a quarterly basis and continued for a period of 12 months following completion of the reclamation.

The permittee assumes the responsibility to demonstrate that any pollution event is not a result of the placement of the fill. If water quality impacts are observed either by the permittee or by the Department, the permittee should address the issue by submitting an assessment plan to the Department. If it is determined that the pollution has occurred as a result of the reclamation fill use, the permittee needs to submit an abatement plan. The Department may ask for additional information during such an event including increased sampling, re-sampling, hydrogeological tests, additional monitoring points, studies and evaluation of the groundwater regime [25 Pa. Code § 77.532].

TRANSITION OF APPROVED SITES

Sites currently importing fill for reclamation purposes should request continued use under this guidance. In some cases, a correction letter may be issued to revise the existing file information in order to meet the specifications in this document. The operator should receive an updated set of permit conditions incorporated into the permit.

ATTACHMENTS

- Appendix A: Sampling and Analyses for Material to be Used as Reclamation Fill
- Appendix B: Landowner consent sample wording
- Appendix C: Screening Parameters

ASSOCIATED DOCUMENTS

- Form 5600-FM-BMP0145: Source Documentation Record
- Form 5600-FM-BMP0478: Self-Certification Form

APPENDIX A

Sampling and Analyses for Material to be Used as Reclamation Fill

The sampling methods and acceptable contaminant concentration limits outlined below are the default methods acceptable to the Department. Mine operators may propose and use other methods if they can demonstrate to the Department and receive approval from the Department that the alternate method is as effective as or an improvement over the methods described below, and will comply with 25 Pa. Code Chapter 77, § 77.126(a)(3).1

If a fill material does not meet the chemical criteria limits provided, that material will be deemed to have failed the demonstration of no presumptive evidence of pollution as stated in 25 Pa. Code Chapter 77, § 77.126, unless the applicant has demonstrated through an alternate method acceptable to the Department that the fill material will meet the requirements of § 77.126. Unless prior approval from the Department has been received, deviations from the methods and contaminant concentration limits described below may fail to meet § 77.126(a)(3).

Sampling of material proposed to be used as fill shall be done either by composite samples or by discrete samples. Sampling in either case shall be random and representative of the fill material being sampled. Sampling is to be in accordance with the most current version of the US EPA Resource Conservation and Recovery Act (RCRA) Manual, SW-846 (Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. Office of Solid Waste and Emergency Response).

(a) Sampling based on composite sampling procedures shall include the following:

(i) For volumes of material equal to or less than 125 cubic yards, a total of eight samples shall be collected and analyzed as follows:

(A) For analysis of all substances other than volatile organic compounds (VOCs), the samples shall be analyzed in two composites of four samples each, in accordance with the most current version of the US EPA Manual, SW-846 (Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. Office of Solid Waste and Emergency Response).

(B) Two samples shall be selected from the eight samples for analysis of VOCs. The samples shall be based on field screening of the eight samples to select those samples that are most likely to contain the highest concentrations of VOCs.

(C) Two grab samples shall be taken from the same areas in the material from which the two samples used for field screening of VOCs were obtained, then sampled and analyzed in accordance with Method 5035 from the most current version of the US EPA Manual, SW-846 (Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. Office of Solid Waste and Emergency Response).

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1 § 77.126(a) states —A permit, permit renewal or revised permit application will not be approved, unless the application affirmatively demonstrates and the Department finds in writing, on the basis of the information in the application or from information otherwise available, that the following apply: (3) The applicant has demonstrated that there is no presumptive evidence of potential pollution of the waters of this Commonwealth.‖

(ii) For volumes of material greater than 125 cubic yards and less than or equal to 3,000 cubic yards,atotal of 12 samples shall be collected and analyzed as follows:

(A) For analysis of all substances other than VOCs, the samples shall be analyzed in three composites of four samples each.

(B) Three samples shall be selected from the 12 samples for analysis of VOCs. The samples shall be based on field screening of the 12 samples to select those samples that are most likely to contain the highest concentrations of VOCs.

(C) Three grab samples shall be taken from the same areas in the material from which the three samples used for field screening of VOCs were obtained, then sampled and analyzed in accordance with EPA Method 5035, referenced in subparagraph (i)(C).

(iii) For each additional 3,000 cubic yards of material or part thereof over the initial 3,000 cubic yards, 12 additional samples shall be collected and analyzed as follows:

(A) For analysis of all substances other than VOCs, the samples shall be analyzed in three composites of four samples each.

(B) Three samples for analysis of VOCs shall be selected from the 12 samples for analysis of VOCs. The samples shall be based on field screening of the 12 samples to select those samples that are most likely to contain the highest concentrations of VOCs.

(C) Three grab samples shall be taken from the same areas in material from which the three samples used for field screening of VOCs were obtained, then sampled and analyzed in accordance with EPA Method 5035, referenced in subparagraph (i)(C).

(b) Sampling based on discrete sampling procedures shall include the following:

(i) For volumes of material equal to or less than 125 cubic yards, a minimum of eight samples shall be collected and analyzed. For volumes of material greater than 125 cubic yards and less than or equal to 3,000 cubic yards, a minimum of 12 samples shall be collected and analyzed. For each additional 3,000 cubic yards of material or part thereof over the initial 3,000 cubic yards, a minimum of 12 additional samples shall be collected and analyzed.

(ii) For VOCs analysis, grab sampling procedures shall be the procedures described in subsection

(a), for the equivalent volumes of material sampled.

(c) Analyses of results:

(i) For a composite sample taken in accordance with subsection (a), the measured numeric value for a parameter shall be less than or equal to the concentration limit listed under the Statewide health standards (see Figure 1) for that parameter in order for the material to qualify as reclamation fill.

(ii) For a grab sample, taken in accordance with subsections (a) and (b), the measured numeric value for a parameter shall be less than or equal to the concentration limit listed under the Statewide health standards for that parameter in order for the material to qualify as reclamation fill.

(iii) For discrete samples required in subsection (b), the measured numeric values for a substance shall be equal to or less than the concentration limit listed under the Statewide health standard for that parameter, with no single sample exceeding more than 10 times the concentration limit for a parameter, and 75% of the samples collected for each 3,000 cubic yards will not exceed the Medium Specific Concentrations (MSCs) selected using the procedures described in § 250.305 for selecting MSCs for soil under the Statewide health standard.

Chemical criteria for placement of reclamation fill relative to the groundwater table

Chemical limits for reclamation fill have been established using the MSCs under Act 2 and Chapter 250, Subchapter C. Tables 1, 2, 3A, 3B, 4A and 4B in Appendix A of Chapter 250 provide the numeric value used to determine the MSCs for groundwater and soil.

The MSCs tables are regularly updated based on current scientific findings and recommendations by the US EPA. Operators should consult the latest values (as published in the Pennsylvania Bulletin) when assessing new source approvals for reclamation fill and as criteria for quality of samples from existing approved sources.

In the event that a change in constituent value results in any reclamation source no longer meeting criteria, the operator should notify the Department of the situation. This may result in additional testing of the parameter in question and/or halting the importation of this source for reclamation fill at previously approved mine sites.

The Department will generally accept the limits as described below as demonstrating that a material will meet the requirements of 25 Pa. Code Chapter 77 § 77.126(3). If an alternate criteria is proposed it is the responsibility of the mine operator to demonstrate to the Department that the alternate method and criteria will meet the requirements of 25 Pa. Code Chapter 77 § 77.126(3).

For purposes of this guidance, groundwater table is defined as the top of the saturated zone. The term includes the regional groundwater table, perched water tables, seasonal high water table and mine pools. The term —smear zone‖ takes into account seasonal groundwater fluctuations.

Leaching limits are derived by the Synthetic Precipitation Leaching Procedure (SPLP). The SPLP test is the Department's normally accepted test method because it more closely simulates a mine environment than the TCLP method. Alternative methods may be considered if it can be demonstrated to the Department that the alternate method is as good as or better than the SPLP test method.

Total and leachate testing will be required from most sites. Those planning to take samples should allow for sufficient volumes to be collected and sent to the laboratory to allow for both phases of testing without resampling. If the laboratory detection limit exceeds any of the levels, the operator should provide an explanation for the difference. Constituent detection limits may vary based on the sample matrix and laboratory analytical method used.

The chemical criteria for approval varies depending on the location of placement of the reclamation fill material – above or below the groundwater table. Groundwater fluctuation is taken into account by requiring more stringent —below groundwater‖ values to be applied at least 10 feet above the smear zone.

Below Groundwater

For the zone —below groundwater‖ there are two options for meeting the quality requirements for reclamation fill.

Option 1: Sample results must be less than or equal to 10% (0.1) of the generic soil to groundwater values for all parameters listed in Tables 3B (organic regulated substances) and 4B (inorganic regulated substances). If the material meets this standard, no leaching tests are required.

Option 2: Sample results must be less than or equal to the values for all parameters listed in Tables 3B (organic regulated substances) and 4B (inorganic regulated substances) **and** leaching tests results must be less than or equal to values for all parameters in Tables 1 and 2 [Used aquifer, TDS less than or equal to 2,500, residential exposure].

Above Groundwater

For the zone —above groundwater‖, the quality requirements are as follows with the exception of the near surface cover (see next section): Sample results must be obtained for all parameters listed in Appendix C of this guidance and compared to the Chapter 250 soil to groundwater numeric value tables (3B for organic regulated substances and 4B for inorganic regulated substances). If any individual constituent result is greater than the generic values in those tables, then the operator must include a leaching test for at least that constituent. The leaching result must not be higher than the respective value in the Chapter 250 groundwater numeric value tables 1 (organic regulated substances) and 2 (inorganic related substances) [Used aquifer, TDS less than or equal to 2,500, residential exposure].

Near Surface (0-15 below surface)

Quality criteria changes when fill is placed near the surface. Values are dependent upon residential or non-residential uses proposed for the land which have different sets of limits in the tables. Future residential use requires limits for material placed 0-15′ below surface. Non-residential use includes limits for the material 0-2′ below surface and another set of limits for material 2-15′ below surface. Dependent upon the reclamation plan indication of residential versus non-residential use, the top 15 feet of material requires quality criteria to be chosen as follows:

- Compare the soil to groundwater values described in the —Above Groundwater‖ section with the appropriate direct contact values for all parameters in Tables 3A and 4A.
- Take the lower of these two values.

When approaching final reclamation grades, the operator should consult with the Department to ensure that appropriate material is being utilized in order to not preclude approval of final reclamation requirements and the release of bonds.

Figure 1 shows a general visual representation of the zones of placement and their respective requirements.

Figure 1

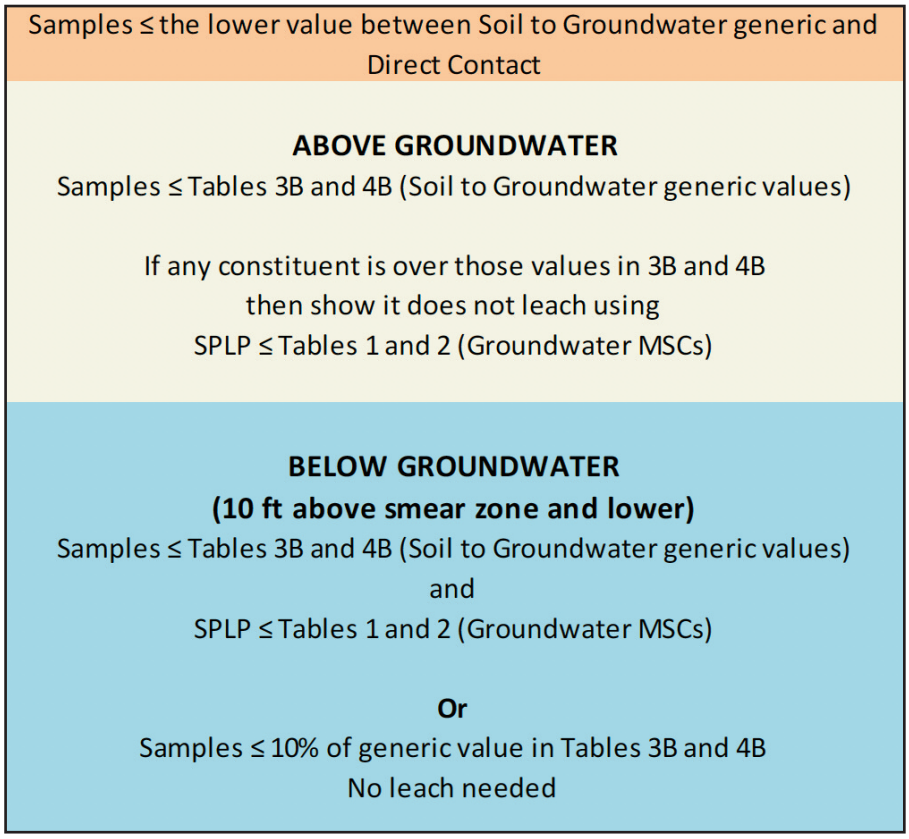

Table 1. List of Groundwater Monitoring Parameters

pH
Acidity
Alkalinity
Aluminum
Ammonia
Arsenic
Barium
Cadmium
Calcium
Chloride
Chromium
Copper
Fluoride
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Nitrate (as N)
Selenium
Silver
Sulfate
Zinc
Biochemical Oxygen Demand
Chemical Oxygen Demand
Conductivity
Methylene Blue Active Substance (Mbas)
Semi-Volatile Organic Compounds
Total Dissolved Solids
Total Suspended Solids
Volatile Organic Compounds

APPENDIX B
Suggested Wording for Land Use Approval

(I) (We), the undersigned, are the owner(s) of _____ acres of land located in _____ (County),

_____ (Township, Borough, City) as described in the deed(s) recorded in the Recorder of Deeds Office, Book(s) and Page(s) _____, and shown by crosshatched lines on the attached map which is signed in the original by the landowner (the Land).

_____ (Name of Mining Operator) (the Operator) proposes to engage in use of imported reclamation fill activities on the Land, and the Operator has applied to the Department of Environmental Protection for permission to engage in such activities. This consent will be made a part of the Operator's application.

WE DO HEREBY ACKNOWLEDGE THAT THE OPERATOR HAS THE RIGHT TO ENTER UPON AND USE THE LAND FOR THE PURPOSE OF USING IMPORTED RECLAMATION FILL.

(I) (We), the undersigned, also irrevocably grant to the Operator and to the Commonwealth of Pennsylvania, the right to enter upon the Land for the purposes of inspecting, studying, collecting samples, and performing other activities related to regulation of reclamation fill activities under applicable statutes, the Department's regulations, and the provisions of any permit(s) issued to the Operator. (I) (We), the undersigned, grant this right of entry for a period of one year prior to commencement of the importation of reclamation fill on the Land described above, during the period of placement of reclamation fill on the Land, and for a period of ten (10) years after completion of the importation of reclamation fill on the Land. (I) (We) also grant to the Commonwealth, for the same period of time, a right of entry across any adjoining or contiguous lands owned by (me) (us) in order to have access to the Land.

It is specifically agreed and understood that this contractual consent gives the Commonwealth the right to enter, inspect, study, obtain samples, and perform other activities related to the regulation of reclamation fill required by law, but does not obligate the Commonwealth to do so and does not constitute any ownership interest by the Commonwealth in the Land.

This Consent shall not be construed to impair any contractual agreement between the Operator and the landowner (the Land).

In witness whereof and intending to legally bind (myself) (ourselves), (my) (our) heirs, successors and assigns, (I) (we) have set (my) (our) hand(s) and seal this _____ day of _____, _____.

_____
LANDOWNER (Print Name)

By: _____
(Signature) (Seal)

By: _____
(Signature)

_____
(Print Name)

ACKNOWLEDGEMENT OF INDIVIDUALS OR PARTNERS

LANDOWNER

STATE OF :
: ss
COUNTY OF :

On _____, before me, the undersigned Notary, personally appeared

_____
(Name (s))

known to me (or satisfactorily proven) to be the person whose name is subscribed to this instrument, and who acknowledged that

(he, she or they) executed the same and desires it to be recorded.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal.

(SEAL) _____ My Commission Expires: _____
(Notary Public) (Date)

ACKNOWLEDGEMENT OF CORPORATIONS

LANDOWNER

STATE OF :
: ss
COUNTY OF :

On _____, before me, the undersigned Notary, personally appeared

_____,
(Name (s))

who acknowledged (herself) (himself) to be the _____ of
(Title of Person)

_____, a
(Name of Corporation)

corporation, and that (she) (he), as such officer, being authorized to do so, executed the foregoing instrument on behalf of the said corporation and desires that this instrument be recorded.

IN WITNESS WHEREOF, I have hereunder set my hand and official seal.

(SEAL) _____ My Commission Expires: _____
(Notary Public) (Date)

This instrument has been recorded in _____
County, Pennsylvania, this _____ day of _____,
_____ (year), at Book _____, Page(s) _____.

_____
(Signed) + (Print Name)

_____
(Seal)

Appendix C
SCREENING PARAMETERS

Aldrin	Anthracene
Benzene	Benzo(a)anthracene
Benzo(a)pyrene	Benzo(b)fluoranthene
Benzo(ghi)perylene	Chrysene
Cumene (Isopropyl benzene)	DDD, 4,4
DDE, 4,4	DDT, 4,4
Dichloroethylene, cis-1,2-	Dieldrin
Ethylbenzene	Fluorene
Indeno(1,2,3-cd)pyrene	Napthalene
PCB-1254 (Aroclor)	Phenanthrene
Pyrene	Toluene
Trichloroethane, 1,1,1-	Trichloroethylene (TCE)
Xylenes (Total)	Arsenic
Barium	Cadmium
Chromium	Lead
Mercury	Selenium
Silver	