

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Waste Management

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TITLE: Management of Fill Policy

AUTHORITY: This document is established in accordance with the Solid Waste Management Act, 35 P.S. §§ 6018.101 *et seq.* (SWMA); the Clean Streams Law, 35 P.S. §§ 691.1 *et seq.*; Section 1917-A of the Administrative Code, 71 P.S. § 510-17; the Land Recycling and Environmental Remediation Standards Act, 35 P.S. §§ 6026.101 *et seq.*

POLICY: This policy is designed to replace the Department of Environmental Protection's (DEP or Department) existing Management of Fill Policy dated August 7, 2010.

PURPOSE: A person placing solid waste onto the ground is generally required to obtain a disposal permit from the Department. A person is not required to obtain a permit under SWMA if the person can demonstrate that the material qualifies as clean fill in accordance with the Municipal and Residual Waste Regulations, 25 Pa. Code § 271.101(b)(3) and § 287.101(b)(6). This policy provides DEP's procedures for determining whether fill is "clean fill" as defined in the municipal and residual waste regulations at 25 Pa. Code § 271.1 and § 287.1, respectively, or "regulated fill," as defined in this policy. Regulated fill may not be used unless a SWMA permit has been issued to the person using the regulated fill.

APPLICABILITY: This policy shall be used to evaluate whether a person is required to obtain a permit under SWMA for the use of fill in accordance with the Municipal and Residual Waste Regulations, 25 Pa. Code § 271.101(b)(3) and § 287.101(b)(6). This policy describes the type of fill that qualifies as clean fill or regulated fill. This policy does not apply to mine land reclamation activities subject to a permit or fill used within the same project area or project right-of-way. Excavation, movement or reuse of fill within a project area or right-of-way of a project is not an activity that requires a SWMA permit. This policy does not apply to fill that has been placed prior to the effective date of this policy, unless the fill is moved to another site or off the project right-of-way after the effective date of this policy.

DISCLAIMER: The policies and procedures outlined in this guidance document are intended to supplement existing requirements. Nothing in the policies or procedures shall affect regulatory requirements. The policies and procedures herein are not an adjudication or a regulation. There is no intent on the part of the DEP to give the rules in these policies 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: 16 pages

DEFINITIONS:

Acid-producing rock – Stone, rock or other mineral materials that, when exposed to air and water, cause a low pH discharge that adversely affects or endangers public health, safety, welfare, or the environment or causes a public nuisance.

Act 2 – The Land Recycling and Environmental Remediation Standards Act, 35 P.S. §§ 6026.101 *et seq.*

Act 2 site – A site as defined in Section 103 of Act 2, 35 P.S. § 6026.103, for which a notice of intent to remediate has been submitted to the DEP.

Background – The concentration of a regulated substance, as determined by appropriate statistical methods, that is present at the site, but is not related to the release of regulated substances at a site.

Background reference area – The area identified for sampling that: will be used to establish background; is sampled and analyzed to determine the concentration of regulated substances found at or within a close proximity to the donor site, at a depth comparable to that of the area to be excavated at the donor site, in the same soil layer as the donor fill; is unaffected by a release; and meets one of the following criteria:

- i. The concentration of regulated substances in the soil is attributable to the parent material from which the soil was derived and the natural processes which produce soil, or
- ii. The concentrations of regulated substances in the soil resulted from an atmospheric deposition, including lead or polynuclear aromatic hydrocarbons, but are not attributable to a specific point source or release of a regulated substance. For the purposes of this definition, "atmospheric deposition" refers only to the ubiquitous, widespread deposition of regulated substances from the air that is incapable of being traced to a specific point source or multiple point sources. For example, chromium that has condensed on the ground outside an electroplater air vent would not be due to "atmospheric deposition" because the presence of the chromium is a result of a discharge from a specific point source, even though the chromium was released into the air before being deposited on the ground. However, the presence of lead or benzo-a-pyrene (BAP) in an urban or industrial area that can be traced to the operation of motor vehicles may be due to atmospheric deposition if the concentration levels are demonstrated to be pervasive over the greater urban or industrial area and not limited to the immediate vicinity of a specific highway or road.

Clean fill – Uncontaminated, nonwater-soluble, nondecomposable inert solid material used to level an area or bring an area to grade. The term includes only those materials that are identified as "fill," as the term is defined in this policy. The term does not include materials placed in or on the waters of the Commonwealth or dredged material. The term does not include fill that has been blended, mixed or treated with the purpose of meeting the definition of "clean fill" and that without being blended, mixed or treated would fail to meet the numeric limits identified in the definition of "uncontaminated material" contained in this policy

Composite sample – A sample collected across a spatial range that typically consists of a set of discrete samples that are combined or "composited." Area-wide or long-term compositing should not be confused with localized compositing in which a discrete sample of the desired size, shape and

orientation is created from many small increments taken at a single location. Two types of composite samples are listed below:

Areal composite – A sample composited from individual equally-sized discrete samples collected on an area or horizontal cross-sectional basis. Each discrete sample is collected in an identical manner. Examples include soil samples from within a grid.

Vertical composite – A sample composited from individual equally-sized discrete samples collected from a vertical cross-section. Each discrete sample is collected in an identical manner. Examples include vertical profiles of soil/sediment columns.

Discrete sample – A sample that represents a single location. A discrete sample can be composed of more than one increment.

Donor site – The area from which fill originates that is separate from a receiving site. Multiple donor sites may be identified on a single property.

Environmental due diligence – Investigative techniques used to determine whether a donor site has been affected by a release of a regulated substance. Examples of investigative techniques included in this term are visual property inspections, electronic data base searches, review of ownership and historical use of a property, Sanborn maps, environmental questionnaires, transaction screens, analytical testing, environmental assessments, audits, or procedures outlined in ASTM standard E1527-13. A single investigative technique may not be used as the basis for environmental due diligence. Environmental due diligence must include visual property inspection and a review of ownership and historical property use, at a minimum. Appendix A of this policy contains guidelines for the collection of samples and analytical testing that is used as part of environmental due diligence.

Fill – Material used to level an area or bring an area to grade. The term is limited to clean, regulated and historic fill that is soil, rock, stone, gravel, used asphalt, and brick, block or concrete from construction and demolition activities and waste from land clearing, grubbing and excavation, including trees, brush, stumps and vegetative material that is separate from other waste and recognizable as such. The term does not include reclaimed asphalt pavement, naturally occurring asbestos, mine spoils or acid-producing rock.

Historic fill – Material, excluding material disposed in landfills, waste piles and impoundments, used to bring an area to grade prior to 1988, and consisting of a conglomeration of soil and residuals, such as ashes from the residential burning of wood and coal, incinerator ash, coal ash, slag, dredged material and construction and demolition waste. The term does not include iron or steel slag that is separate from residuals if it is a coproduct, as the term is defined in 25 Pa Code §287.1, and satisfies the requirements of 25 Pa. Code § 287.8. The term does not include coal ash that is separate from residuals if it is beneficially used in accordance with 25 Pa. Code §§ 290.1 – 290.415.

PCB – Polychlorinated biphenyl.

ppm – Parts per million.

Project area – The extent of earth disturbance activities within a property boundary, including areas in close proximity to the earthmoving activities that are necessary for the completion of a construction project, or other human activity which disturbs the surface of the land, including land clearing and

grubbing; grading; excavations; embankments; land development; agricultural plowing or tilling; operation of animal heavy use areas; timber harvesting activities; road maintenance activities; oil and gas activities; well drilling; mineral extraction; and the moving, depositing, stockpiling, or storing of soil, rock or earth materials. The term includes the boundary within which all earth disturbance activity, construction, materials storage, grading, landscaping and related activities occur.

Reclaimed asphalt pavement (RAP) – Small particles, typically less than one inch in size, of bitumen and inorganic materials produced by the mechanical grinding of bituminous pavement surfaces that have not been subject to a release of regulated substances or mixed with other solid waste. The term does not include used asphalt.

Receiving site – The area to which fill is proposed to be relocated. A receiving site is separate from a donor site and not part of a project area or right of way.

Regulated fill – “Fill,” as the term is defined in this policy, that has been affected by release of a regulated substance and is not “uncontaminated material,” as the term is defined in this policy. The term includes “dredged material,” as the term is defined by the Municipal and Residual Waste Management Regulations, 25 Pa. Code §§ 271.1 and 287.1, whichever is applicable. The term does not include fill that has been blended, mixed or treated with the purpose of meeting the definition of “regulated fill” and that without being blended, mixed or treated would fail to meet the numeric limits applicable to regulated fill.

Regulated substance – The term includes hazardous substances and contaminants regulated under the Hazardous Sites Cleanup Act, 35 P.S. §§ 6020.101 *et seq.*; and substances regulated by the Clean Streams Law; the Air Pollution Control Act, 35 P.S. §§ 4001 *et seq.*; the Solid Waste Management Act, 35 P.S. §§ 6018.101 *et seq.*; the Infectious and Chemotherapeutic Waste Law, 35 P.S. §§ 6019.1 *et seq.*; and the Storage Tank and Spill Prevention Act, 35 P.S. §§ 6021.101 *et seq.*

Release – Spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing of a regulated substance into the environment in a manner not authorized by the Department. The term includes the abandonment or discarding of barrels, containers, vessels and other receptacles containing a regulated substance.

Uncontaminated or Uncontaminated material – The term means either of the following:

- (1) Fill unaffected by a release of a regulated substance or,
- (2) Fill affected by release of a regulated substance, if the concentrations of regulated substances, with the exception of PCBs, do not exceed the numeric values specified in Table 3 [Medium-Specific Concentrations (MSCs) for Organic Regulated Substances in Soil] and Table 4 [Medium-Specific Concentrations (MSCs) for Inorganic Regulated Substances in Soil] of Appendix A in 25 Pa. Code Chapter 250 (related to administration of land recycling program), as determined in this definition. Analysis should be carried out for all regulated substances suspected due to a release. The applicable numeric limit is determined by comparison of the Generic Soil to Groundwater Value¹ with the Direct Contact Residential Value² and selection of the lower of the two values.

¹ Generic Soil to Groundwater Value - Numeric values based on generic leaching modeling for soils at residential properties overlying used aquifers with total dissolved solids at concentrations less than or equal to 2500 mg/L.

² Direct Contact Residential Value - Direct contact numeric values for soils at residential properties.

The term does not include fill that has been blended, mixed or treated with the purpose of meeting the definition of “uncontaminated material.” For PCBs, the sum total of the concentration of all PCB Aroclors (total PCB concentration) may not exceed 50 ppm. Fill containing a total PCB concentration greater than 2 ppm requires further evaluation, in accordance with the instructions provided in Section B.1.c of this policy.

Used asphalt – Large pieces, greater than one inch in size, of bitumen and inorganic materials from the demolition of bituminous pavement. The term does not include RAP.

REFERENCES:

25 Pa. Code Chapters 287 to 299 (residual waste regulations)

25 Pa. Code Chapters 271 to 285 (municipal waste regulations)

Solid Waste Management Act, 35 P.S. §§ 6018.101 *et seq.*

Land Recycling and Environmental Remediation Standards Act, 35 P.S. §§ 6026.101 *et seq.*

Section 1917-A of the Administrative Code, 71 P.S. § 510-17

The Clean Streams Law, 35 P.S. §§ 691.1 *et seq.*

TECHNICAL GUIDANCE:

A. Purpose and Applicability

Fill materials are used in construction or earthmoving projects across the Commonwealth to level an area or bring an area to grade. These projects may involve using fill material as subbase, or to fill in low-lying areas. The manner in which fill may be reused depends on whether the fill is clean fill or regulated fill. This policy provides procedures for determining whether fill is clean fill or regulated fill and describes how each category may be managed after a fill determination has been performed.

This policy does not apply to the following activities:

- Mine land reclamation activities subject to a permit.
- Movement or use of fill within a project area or right-of-way.
- Clean fill or regulated fill that has been used as such prior to the effective date of this policy [editor's note: the effective date will be the date this revised policy is published as final in the *Pennsylvania Bulletin*], unless the fill is relocated to another receiving site, project area or off the project right-of-way after the effective date of this policy [editor's note: the effective date will be the date this revised policy is published as final in the *Pennsylvania Bulletin*].

In general, fill that is demonstrated to be clean fill can be used in an unrestricted manner, provided it is not placed in waters of the Commonwealth, it is used in compliance with 25 Pa. Code, Chapters 102 and 105 (relating to erosion and sediment control and dam safety and waterway management, respectively), and it is managed in accordance with Section D of this policy. Depending on the manner in which it is generated, clean fill may be a "waste," as that term is defined in the Municipal and Residual Waste Management Regulations, 25 Pa. Code § 271.1 and § 287.1, respectively, whichever is applicable.

Fill that is demonstrated to be regulated fill can be used by persons who have applied for and obtained coverage under the Department's General Permit No. WMGR096, Regulated Fill. Coverage under General Permit No. WMGR096 is not required in the following instances:

- Remediation activities undertaken entirely on an Act 2 site, pursuant to the requirements of § 902 of Act 2.
- When fill from an Act 2 site is used as construction material at a receiving site that is being remediated to attain an Act 2 standard, provided the procedural and substantive requirements of Act 2 and the conditions specified in Section C.2.a. and b. of this policy are satisfied.
- Use of the regulated fill is limited to the excavation, movement or reuse of the regulated fill within a project area or right-of-way of a project.

Regulated fill is a "waste," as that term is defined in the Municipal and Residual Waste Management Regulations, 25 Pa. Code § 271.1 and § 287.1, respectively.

B. Procedure for Performing a Fill Determination

Prior to the movement of fill to a receiving site, either the person proposing to provide fill from a donor site or the person proposing to receive the fill shall determine whether the fill is clean fill or regulated fill pursuant to this policy. The following steps must be followed to make the determination:

1. Determine Eligibility: For a material to be managed as clean or regulated fill under this policy, it must satisfy all of the following criteria:
 - a. The material is “fill,” as the term is defined in this policy.
 - b. The fill does not contain regulated substances that were intentionally released.
 - c. The fill has not been blended, mixed or treated with the purpose of meeting the definition, or applicable numeric limits, of “uncontaminated material,” “clean fill” or “regulated fill.”
 - d. The fill does not exhibit a characteristic of toxicity, as determined by 40 CFR § 261.24 (relating to toxicity characteristic).
 - e. PCB-containing Fill: Fill containing a concentration of total PCBs greater than 2 parts per million (ppm) may be subject to regulation under the Toxic Substances Control Act (TSCA), 15 U.S.C. §§ 2601 *et seq.*, and 40 CFR Part 761, which is administered and implemented by the U.S. Environmental Protection Agency (EPA). Fill containing a concentration of total PCBs greater than 2 parts per million (ppm) may not be managed under this policy unless written approval from EPA has been received prior to DEP review. For information regarding EPA’s requirements for determining if PCB-containing fill can be used, contact the PCB Coordinator for EPA Region 3 by email at R3_PCB_Coor@epa.gov prior to transporting the fill off the donor site or accepting fill for use at a receiving site.
2. Perform Environmental Due Diligence: Once determined that the fill is eligible for use under this policy, the fill must be evaluated to determine whether it has been affected by a release of a regulated substance by performing “environmental due diligence,” as the term is defined in this policy. Analytical testing of the fill is not required unless environmental due diligence indicates evidence of a release or possible release of a regulated substance at or near the donor site, or historic use of the donor site indicates the possibility of a release of a regulated substance.
 - a. If due diligence shows no evidence of a release or possible release, the fill may be managed as clean fill in accordance with the Section D of this policy (relating to management of clean fill) unless during movement, transport or placement there are observable indications (such as appearance or odors) which indicate the possible presence of a release of a regulated substance.
 - b. If due diligence shows evidence of a release or possible release at or near the donor site, the fill must be tested to determine if it is clean fill or regulated fill. Testing must be

performed in accordance with Appendix A of this policy. Analysis must be carried out for all regulated substances suspected due to a release.

- i. If testing reveals that the fill contains regulated substances at concentrations that are below the numeric limits referenced in the definition of uncontaminated material, the fill may be managed as clean fill in accordance with Section D of this policy. A person may not blend, mix or treat fill that would otherwise fail to meet the numeric limits identified for clean fill with the purpose of meeting the definition of uncontaminated material or clean fill.
- ii. If testing reveals that the fill contains regulated substances at concentrations that exceed the numeric limits referenced in the definition of uncontaminated material, but are at or below the numeric limits contained in General Permit No. WMGR096, the fill may be managed as regulated fill only if coverage under General Permit No. WMGR096 is obtained. A person may not blend, mix or treat fill that would otherwise fail to meet the numeric limits identified for regulated fill with the purpose of meeting the definition of regulated fill. Regulated fill shall be managed in accordance with the Section C of this policy (relating to management of regulated fill).
- iii. If testing reveals that the fill contains regulated substances at concentrations that exceed the numeric limits referenced in General Permit No. WMGR096, the fill may not be managed as clean fill or regulated fill. Fill exceeding the numeric limits referenced in General Permit No. WMGR096 may require disposal in accordance with the Hazardous, Municipal or Residual Waste Management Regulations, 25 Pa Code, Articles VII, VIII or IX, respectively, whichever is applicable.

C. Management of Regulated Fill

Regulated fill must be managed in accordance with the Department's Municipal or Residual Waste Regulations, 25 Pa. Code § 271.2 and § 287.2, respectively, whichever is applicable, and may be beneficially used in accordance with General Permit No. WMGR096.

Coverage under General Permit No. WMGR096 is not required in the following instances:

1. Remediation activities undertaken entirely on an Act 2 site, pursuant to the requirements of Section 902 of Act 2.
2. When fill from an Act 2 site is used as construction material at a receiving site that is being remediated to attain an Act 2 standard, provided the procedural and substantive requirements of Act 2 and the following are satisfied:
 - a. Regulated substances contained in the fill are incorporated into the notice of intent to remediate and the final report.
 - b. Movement of fill between Act 2 sites is documented in the final reports for both the donor site and receiving sites.

- c. Placement of the fill does not and will not cause the receiving site undergoing remediation to exceed the selected Act 2 standard.

A person or municipality interested in obtaining coverage under General Permit No. WMGR096 must apply to the Department in accordance with the application instructions provided in the permit. The terms and conditions of General Permit No. WMGR096 are available on the Department's website.

D. Management of Clean Fill

Pursuant to 25 Pa. Code § 271.101(b)(3) and § 287.101(b)(6), use of clean fill does not require a permit under the SWMA or the Municipal or Residual Waste Regulations. Clean fill may be used in accordance with all applicable requirements governing the placement or use of clean fill, including 25 Pa. Code Chapter 102 (relating to erosion and sediment control) and 25 Pa. Code Chapter 105 (relating to dam safety and waterway management). The use of clean fill may be regulated under other environmental laws and regulations.

If the brick, block or concrete from a construction or demolition activity is intended for use as clean fill, best management practices (BMPs) must be followed prior to demolition activities to remove from a building or structure all materials that do not meet the definition of clean fill, such as materials or surfaces covered with lead-based paint, friable asbestos, and hazardous materials such as mercury switches, PCB ballasts, tritium-containing exit signs, and fluorescent light bulbs.

Clean fill may not contain any free liquids based on visual inspection, and must not create a public nuisance (such as an objectionable odor) to users of the receiving site or adjacent properties.

Any person using clean fill under this policy must complete and submit Form FP-001, Certification of Clean Fill (2500-FM-BWM0008) to the DEP Regional Office serving the county in which the receiving site is located prior to transporting clean fill from the donor site. FP-001 must be completed and submitted regardless of whether sampling and analysis are performed as part of environmental due diligence. Sections 1 and 2 of Form FP-001 must be completed by the person making the clean fill determination at the donor site. Section 3 must be completed by the person receiving the fill.

If the donor site has undergone or is undergoing cleanup or remediation under a local, state or federal regulatory program that requires site characterization, or if the fill proposed to be managed as clean fill has otherwise been subject to analytical testing or other procedures identified in the definition of "environmental due diligence," copies of all laboratory reports and EPA approval for use of PCB-containing fill, if applicable, shall be attached to Form FP-001. The owner of the receiving site shall provide a copy of the completed Form FP-001 and attachments to the DEP Regional Office serving the county in which the receiving site is located. If a person receives fill from multiple donor sites, a separate Form FP-001 is required for each donor site.

If a background demonstration is made, as described in Appendix A of this policy, the FP-001 must include documentation of the background demonstration along with documentation demonstrating that an equivalent site evaluation has been performed and the requirements of Appendix A have been satisfied.

Both the donor site and the receiving site are responsible for maintaining copies of the completed Form FP-001 for a period of five (5) years. Copies of the form and all supporting documentation, including analytical test reports, must be made available and provided to the Department upon request.

Appendix A

Sample Collection and Analytical Testing Requirements for Performing Environmental Due Diligence

Prior to the transportation of fill from the donor site, or use of fill at a receiving site, a fill determination must be made under Sections B-D of the Management of Fill policy. Analytical testing of the fill is not required unless environmental due diligence indicates evidence of a release, or the possibility of a release, of a regulated substance. This appendix provides guidelines for using analytical testing as part of the environmental due diligence.

A. Sampling Plan Development

The first step in a chemical evaluation of fill is to develop a plan for sampling. Persons using analytical testing as part of the environmental due diligence must develop and implement a scientifically credible sampling plan in accordance with the most recent version of the EPA's publication, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, also known and hereinafter referred to as SW-846, and the *RCRA Waste Sampling Draft Technical Guidance, EPA530-D-02-002*. Chapter 9 of SW-846 describes procedures for developing a sampling plan and the statistical treatment of data. Where there is disagreement between the procedures outlined in this Appendix A and the referenced EPA documents, the procedures contained in this Appendix A must shall be followed.

A systematic planning process, such as the Data Quality Objectives Process identified in the *RCRA Waste Sampling Draft Technical Guidance*, must be employed to set objectives for the type, quantity and quality of data needed to demonstrate with a known level of assurance that the applicable standards for clean fill or regulated fill are achieved. The level of complexity and detail needed in the sampling plan are directly related to the size, scope and level of complexity of the donor site.

The scientific objectives of a sampling plan developed under this policy must include the following, at a minimum:

- To identify and quantify known or suspected contaminants in the fill.
- To collect samples that will allow measurements of the chemical properties of the fill that are both accurate and precise.
- To collect representative samples, which for the purposes of implementing this policy are samples exhibiting average properties of the whole volume of fill.
- To collect enough samples, and in no case less than eight samples, to sufficiently represent the variability of the fill.
- To obtain a statistically valid and reliable estimate of the fill's chemical properties.

Fill must be characterized horizontally and vertically to represent the entire volume of fill to be transported off the donor site and used at a receiving site. A thorough characterization must be able to provide the following information:

- Identity of regulated substances associated with a release that are present in the fill, the concentration of each identified regulated substance, and the spatial variation in concentration of each regulated substance both horizontally and vertically.
- The physical characteristics of the fill in which the regulated substances associated with a release are present. These include the fill type (such as soil, rock, dredge), texture, dry bulk density, permeability, organic carbon content, porosity, and moisture content. Documentation of these properties and any significant variability over the donor site must be included.

The sampling plan must include a summary of existing information about the donor site, including any previously performed sampling or analysis information, preliminary estimates of summary statistics such as the mean and standard deviation, process descriptions and materials used, spatial boundaries of the donor site to be managed under this policy, information about what is known or suspected at the donor site, releases, and release mechanisms. This information must be documented by written descriptions of site conditions and supported by maps, cross-sections, and site diagrams, and any other descriptive, graphical, or tabular illustrations necessary to characterize site conditions.

The boundaries of the donor site must be clearly defined and represent the total collection of possible sampling units that can be drawn. Sampling units for fill managed under this policy must represent the total volume of fill being characterized pursuant to Sections B and C of this Appendix. Sampling plans may include a combination of probability sampling and authoritative sampling designs depending on conditions at the donor site. Soil characterization samples must be collected from areas with anticipated highest levels of regulated substances (in other words, biased sampling) to identify “hot spots” or areas that require further evaluation. For example, areas that housed an underground storage tank or experienced a release of regulated substances should be sampled authoritatively and more frequently than other areas of the donor site. The remaining area of the donor site should be sampled using probability sampling, in which all parts of the fill being characterized have a known probability of being included in the characterization.

For fill containing PCBs at any concentration, samples used to quantify the PCB concentration in the fill must be collected in accordance with EPA’s *Standard Operating Procedure for Sampling Porous Surfaces for Polychlorinated Biphenyls (PCBs)*.

B. Sampling Procedures for Fill Stored in Piles

There are several variables involved in the sampling of fill stored in piles, including the size and shape of the pile, compactness of the fill, and physical properties of the fill. The size and shape of the pile should be used to calculate volume and to plan for the correct number of samples to be taken. Simple random sampling or stratified random sampling should be used to obtain a representative sample from a fill pile, in accordance with SW-846 and Section 5.3 of the *RCRA Waste Sampling Draft Technical Guidance, EPA530-D-02-002*. Simple random sampling should be used unless one of the following conditions exists:

- There are known distinct strata.
- An objective of the sampling is to prove or disprove that there are distinct strata.

- The number of samples is limited, and an objective of the sampling is to statistically minimize the size of a hot spot that might not get sampled.

Stratified random sampling can be employed only if all points within the pile can be accessed. In such cases, the pile should be divided into a three-dimensional grid system. The grid cubes should be numbered, and the grid cubes to be sampled should be chosen by random number tables or generators.

Generally, stainless steel shovels, trowels, or scoops should be used to clear away surface material before samples are collected. Depth samples may be collected using a decontaminated auger. For a sample core, thin-wall tube samplers or grain samplers may be used. Near surfaces, samples can be collected with a clean, stainless steel spoon or trowel. All samples collected, except those for volatile organic analysis, should be placed into a Teflon-lined or stainless-steel pail and mixed thoroughly before transfer to the appropriate sample container.

The sampling and subsequent analysis of fill stored in piles may be performed by collecting composite or discrete samples, unless the samples are being used to quantify the concentration of PCBs in the fill.

1. Procedure for Using Composite Samples:

- a. Composite sampling must not be used if the integrity of the individual sample values changes because of the physical mixing of discrete samples.
- b. For up to 125 cubic yards of fill, eight discrete samples (plus two grab samples for VOCs) must be collected and handled as follows:
 - i. Prior to compositing, field screen the eight discrete samples to identify the two that are most likely to contain the highest concentrations of volatile organic compounds (VOCs).
 - ii. In accordance with SW-846 Method 5035, collect grab samples for VOC analysis from the two points identified by the field screening described above.
 - iii. For all other substances, the eight discrete samples collected must be combined into two composite samples comprised of four discrete samples each. Analysis shall be performed on the two composite samples in accordance with SW-846.
- c. For greater than 125 cubic yards and up to and including 3,000 cubic yards, 12 discrete samples (plus three grab samples for VOCs) shall be collected and handled as follows:
 - i. Prior to compositing, field screen the 12 discrete samples to identify the three that are most likely to contain the highest concentrations of VOCs.
 - ii. In accordance with SW-846 Method 5035, collect grab samples for VOC analysis from the same sampling points as the three discrete samples identified by field screening.

- iii. For all other substances, the 12 discrete samples collected shall be combined into three composite samples comprised of four discrete samples each. Analysis shall be performed on the three composite samples in accordance with SW-846.
 - d. For each additional 3,000 cubic yards of fill or part thereof over the initial 3,000 cubic yards, 12 additional discrete samples (plus three grab samples for VOCs) shall be collected and handled in accordance with paragraph c.iii. above.
2. Procedure for Using Discrete Samples:
 - a. For up to 125 cubic yards of fill, a minimum of eight discrete samples (plus two grab samples for VOCs) shall be collected and analyzed. For volumes of fill greater than 125 cubic yards and up to and including 3,000 cubic yards, a minimum of 12 discrete samples (plus three grab samples for VOCs) shall be collected and analyzed. For each additional 3,000 cubic yards of fill or part thereof over the initial 3,000 cubic yards, a minimum of 12 additional discrete samples (plus three grab samples for VOCs) shall be collected and analyzed.
 - b. For VOCs analysis, grab sampling shall be performed as described in subsection B.1.
3. Evaluation of Results:
 - a. For a composite sample collected in accordance with subsection B.1, the measured numeric value for a parameter shall not exceed the numeric limit referenced in the definition of uncontaminated material for that parameter for the fill to be managed as clean fill, or in Table GP-1a or GP-1b of General Permit No. WMGR096 for that parameter for the fill to be managed as regulated fill.
 - b. For a grab sample collected for VOC analysis in accordance with subsections B.1 and B.2, the measured numeric value for a parameter shall not exceed the numeric limit referenced in the definition of uncontaminated material for that parameter for the fill to be managed as clean fill, or in Table GP-1a or GP-1b of General Permit No. WMGR096 for that parameter for the fill to be managed as regulated fill.
 - c. For discrete samples collected in accordance with subsection B.2, the measured numeric values for a substance in 75% of the discrete samples shall not exceed the numeric limit referenced in the definition of uncontaminated material, or in Table GP-1a or GP-1b of General Permit No. WMGR096 for that parameter. For persons using the discrete sampling method, no single sample may show regulated substances at a concentration that is more than twice the numeric limit for any parameter.
4. Alternate Evaluation of Data:

In lieu of subsection B.3, a person may use the 95% Upper Confidence Limit (UCL) of the arithmetic mean to determine whether the fill meets the appropriate concentration limits for use as clean or regulated fill. The calculated 95% UCL of the arithmetic mean must be

below the appropriate numeric limit for clean or regulated fill. Persons intending to use this method for the treatment of data must determine a minimum number of samples in accordance with SW-846 and the *RCRA Waste Sampling Draft Technical Guidance, EPA530-D-02-002*. The application of the 95% UCL of the arithmetic mean shall comply with the following performance standards:

- a. The null hypotheses (Ho) shall be that the true arithmetic average concentration is at or above the appropriate concentration limit, and the alternative hypothesis (Ha) shall be that the true arithmetic average concentration is below the appropriate concentration limit.
- b. The underlying assumptions of the statistical method shall be met, such as data distribution.
- c. Compositing cannot be used for volatile organic compounds.
- d. The censoring level for each non-detect shall be the assigned value randomly generated that is between zero and the limit related to the practical quantitation limit (PQL).
- e. Tests shall account for spatial variability, unless otherwise approved by the Department.
- f. Statistical testing shall be done individually for each parameter detected.
- g. Where a fill has distinct physical, chemical or biological characteristics, or originates from different areas, the statistical testing shall be done separately.
- h. The following information shall be documented:
 - i. A description of the original areas of the fill and physical, chemical and biological characteristics of the fill.
 - ii. A description of the underlying assumptions of the statistical method.
 - iii. Documentation showing that the sample data set meets the underlying assumptions of the statistical method.
 - iv. Documentation of input and output data for the statistical test, presented in tables or figures, or both, as appropriate.
 - v. An interpretation and conclusion of the statistical test.

C. Sampling Procedures for In-situ Fill

For the purposes of this policy, “in-situ fill” refers to fill that is undisturbed in its original location at the donor site or fill that has previously been used as clean or regulated fill and will be subsequently excavated and moved to a receiving site. Sampling conducted on in-situ fill to evaluate whether fill can be managed as clean or regulated fill must characterize both the vertical and horizontal extent of

the fill to be transported and used at a receiving site. Where multiple zones of contamination are possible due to the manner in which fill was originally placed, the characterization and demonstration that the fill meets the definition of uncontaminated material or the limits contained in General Permit No. WMGR096 apply individually to the separate zones.

A method of random sampling, such as simple random, stratified random sampling, shall be chosen based on knowledge of the donor site as set forth in SW-846 or the *RCRA Waste Sampling Draft Technical Guidance, EPA530-D-02-002*. Apart from known hot spots, which may require further sampling and analysis, the donor site should be divided into a three-dimensional grid. Each grid cube should be the same size and shape and have equal volumes of fill. Composite samples may not be used for in-situ fill.

The number of sample points is determined by the volume of fill being characterized. Sampling frequency must account for the depth of donor fill to be removed. If one area of donor fill will be excavated to more than one depth (for example, three feet in one part and six feet in another part), then the samples should be distributed accordingly at multiple depths to be representative of the full depth of each cut. The minimum number of samples shall be determined using the procedure outlined in subsection B.2 of this Appendix. Additional sampling may be necessary based on site-specific conditions.

Evaluation of Data. Sample data must be evaluated separately for each donor site by using one of the methods listed in this section. For Method 2 listed below, the evaluation of data must comply with subsection B.4 above.

1. Method 1: 75% of all samples must be less than or equal to the numeric limit referenced in the definition of uncontaminated material to be managed as clean fill or the numeric limit contained in General Permit No. WMGR096 to be beneficially used as regulated fill. No individual sample result may exceed twice the applicable numeric limit.
2. Method 2: The 95% UCL of the arithmetic mean shall be less than or equal to the numeric limit referenced in the definition of uncontaminated material to be managed as clean fill or the numeric limit contained in General Permit No. WMGR096 to be beneficially used as regulated fill, as applied in accordance with SW-846 and the *RCRA Waste Sampling Draft Technical Guidance, EPA530-D-02-002*.

D. Use of the Synthetic Precipitation Leaching Procedure (SPLP, SW-846 Method 1312) to Establish an Alternative Soil-to-Groundwater Value

Proposed fill may be analyzed using SPLP to provide an alternate soil-to-groundwater value for use in determining whether the fill is uncontaminated. The value obtained using the SPLP represents a concentration of a regulated substance in the fill that does not produce leachate in which the concentration of the regulated substance exceeds the groundwater MSC identified in Table 3 or 4 of Appendix A in 25 Pa. Code, Chapter 250. If SPLP is used to identify an alternative soil-to-groundwater value, the alternative value is only applicable to the fill that was tested using SPLP.

The following procedure must be used to determine an alternative soil-to-groundwater value based upon the SPLP:

1. During characterization of the donor site, obtain a minimum of ten samples from the proposed fill. The four samples with the highest total concentration of the regulated substance must be submitted for SPLP analysis. Samples obtained will be representative of the soil type and horizon impacted by the release of the regulated substance.
2. Determine the lowest total concentration (TC) that generates a failing SPLP result. The alternative soil-to-groundwater value will be the next lowest TC.
3. If all samples result in a passing SPLP level, the alternative soil-to-groundwater value will be the TC corresponding to the highest SPLP result. Additional samples may be collected.
4. If none of the samples generates a passing SPLP, additional samples may be collected and concurrent TC/SPLP analyses performed to satisfy the above requirements for establishing an alternative soil-to-groundwater value.
5. The alternative soil-to-groundwater value is then compared to the direct contact residential value. The lower of the two values is the applicable numeric limit.

E. Performing a Background Demonstration and Equivalent Site Evaluation

If fill from the donor site contains regulated substances at concentrations exceeding the numeric limits in the definition of uncontaminated material, a demonstration may be made to show that the exceedance is due to background at the donor site. If a successful background demonstration is made, an equivalent site evaluation must also be performed prior to transporting the fill to a receiving site. The equivalent site evaluation ensures that no new regulated substance is placed on the receiving site other than a regulated substance already determined to be present and that the concentration(s) of regulated substance(s) in the donor fill has been compared to the concentration(s) of the same regulated substance(s) at the receiving site in accordance with subparagraphs E.3.b.i-ii. of this appendix. Regulated substances detected in the donor fill that are below the numeric limits referenced in the definition of uncontaminated material do not require a background demonstration or an equivalent site evaluation.

Generally, only naturally occurring metals, lead and some ubiquitous organics, such as polynuclear aromatic hydrocarbons (PAHs), from widespread atmospheric deposition, are eligible for a background demonstration. When data or other information indicates that a regulated substance has migrated onto the donor site from the release of a regulated substance at another site, the regulated substance is not due to background of that substance at the donor site. Pathways for the migration of a regulated substance due to an offsite release include surface runoff from specific sources (such as runoff from parking lots and storage facilities where spills have occurred); spills at railroad facilities and in railroad rights-of-way; and air deposition of regulated substances from specific sources.

The following guidelines must be used when performing a background demonstration under this policy:

1. Select a Background Reference Area:

The first step in making a demonstration that the presence of a regulated substance is due to background at the donor site and is not due to a release is to select a background reference area, as the term is defined in this policy, to collect samples for the purpose of establishing

background at the donor site. Samples may be collected from the background reference area to demonstrate that an exceedance of a numeric standard can be attributed to background, as the term is defined in this policy. Background reference areas must not include areas affected by a known or suspected release of a regulated substance, including areas impacted by road runoff, areas near railroads affected by engine exhaust contaminants, and areas near buildings contaminated by paint chips. In urban areas, background reference areas may include areas where widespread, ubiquitous contamination is present that cannot be traced to a specific source.

Background reference areas must be as similar as possible to the donor site. The ideal background reference area is a location that only differs from the donor site by the absence of the source that released the regulated substance. Every attempt must be made to reduce the factors that are different between the background reference area and the donor site.

This does not mean that a sample collected at a location that is a considerable distance from an area known or suspected to have been affected by a release of a regulated substance is unacceptable merely because the known or suspected regulated substance is detected in the sample. The presence of regulated substance outside of the area known or suspected to have been affected by a release may indicate that the presence of the regulated substance is truly ubiquitous, widespread and incapable of being traced to a specific source. In this case, the regulated substance may be part of the background at the donor site.

A background reference area that meets the following criteria must be selected for the background demonstration:

- a. A background reference area must be free of regulated substances from any release or that can be traced to a specific source.
- b. Sampling at the background reference area must be random and comparable to the sampling of the donor site in depth and horizontal extent.
- c. A background reference area must not differ significantly from the donor site with respect to the following:
 - i. Physical, chemical or biological characteristics that might cause inherent differences in the measurement process.
 - ii. Geological characteristics, such as location, topography, size/area, and the like.
 - iii. Hydrology.
 - iv. Soil sampling depth.
- d. Within cities, preference must be given to vacant land that has not received imported fill, naturally wooded areas, parks or large residential lots.
- e. A background reference area must not be located immediately next to or within the area of a point source.
- f. A background reference area with obvious vegetation damage must be avoided.

- g. The history of the background reference area and adjacent land, including current and previous activities, must be considered and documented.
- h. A background reference area must not be:
 - i. An area of added or imported fill, including soil and waste.
 - ii. A location near buildings, especially where paint chips may be present.
 - iii. A location where industrial or other contaminant-generating activities are known to have taken place, including open garbage burning areas, vehicle parking and storage and material storage areas.
 - iv. A location near known air deposition source, such as a foundry, coal-fired power plant or other air pollution source that may have deposited metals or other contaminants onto the soil in the area.

2. Sampling, Analysis and Evaluation of Data:

Background shall be established by a sampling methodology that is statistically valid and consistent with the methodology used to perform the fill determination. Where appropriate, analysis methods for background samples must be the same as the methods used for performing the fill determination.

The analytical results of background samples must be compared with the results obtained from the fill determination. The comparison must be made using one of the following statistical methods:

- a. The person shall demonstrate that the highest measurement from the donor site is not greater than the highest measurement from the background reference area. The Department may accept insignificant variances in numbers. The minimum number of samples to be collected is 10 from the background reference area and 10 from each donor site.
- b. The Department may accept another appropriate statistical method if it meets the requirements below.
 - i. For nonparametric and parametric methods, the false-positive rate for a set of data applied to a statistical test may not be greater than 0.05. The minimum number of samples to be collected is 10 from the background reference area and 10 from each donor site.
 - ii. For parametric methods, the censoring level for each non-detect (ND) shall be the assigned value randomly generated that is between zero and the limit related to the primary quantitation limit (PQL).

3. Equivalent Site Evaluation:

The equivalent site evaluation ensures that no new regulated substance is placed on the receiving site other than a regulated substance that is already determined to be present and

that the concentration(s) of regulated substance(s) in the donor fill has been compared to the concentration(s) of the same regulated substance(s) at the receiving site in accordance with subparagraphs E.3.b.i-ii. of this appendix. Regulated substances detected in the donor fill that are below the numeric limits referenced in the definition of “uncontaminated material” do not need to be included in the equivalent site evaluation. The equivalent site evaluation must be performed prior to transporting fill from the donor site. The FP-001 must include documentation demonstrating that the equivalent site evaluation has been performed and is satisfied in accordance with this section.

a. Develop a Plan for Sampling the Receiving Site.

A background determination must be made on the receiving site to identify the regulated substances that are present at the receiving site due to background and determine the concentrations of the identified regulated substances. Development of a sampling plan in accordance with Section A of this Appendix is necessary to characterize the receiving site in a similar manner to how the donor site is characterized.

The sampling plan must include a summary of existing information about the receiving site, including any previously performed sampling or analysis information, process descriptions and materials used, spatial boundaries of the receiving site to be managed under this policy, information about what is known or suspected at the receiving site, releases, and release mechanisms. This information must be documented by written descriptions of site conditions and supported by maps, cross-sections, and site diagrams as well as any other descriptive, graphical, or tabular illustrations necessary to characterize site conditions.

The boundaries of the receiving site must be clearly defined and represent the total collection of possible sampling units that can be drawn. The receiving site should be sampled using probability sampling, in which all parts of the site being characterized have a known probability of being included in the characterization, except for areas of the receiving site that are affected by a known or suspected release of a regulated substance, including areas impacted by road runoff, areas near railroads affected by engine exhaust contaminants, and areas near buildings contaminated by paint chips, unless the entire receiving site is part of a larger urban area where ubiquitous, widespread contamination is present that is incapable of being traced to a specific source.

The sampled area of the receiving site for establishing background must be selected in accordance with the following:

- i. The area sampled must be free of regulated substances from any release of a regulated substance or that can be traced to a specific source.
- ii. Sampling must be random and comparable to the area where donor fill is to be placed on the receiving site in depth and horizontal extent.
- iii. The area sampled must not differ significantly from the donor site with respect to the following:

- (A) Physical, chemical or biological characteristics that might cause inherent differences in the measurement process.
 - (B) Geological characteristics, such as location, topography, size/area, and the like.
 - (C) Hydrology.
 - (D) Soil sampling depth.
- iv. Within cities, preference must be given to vacant land that has not received imported fill, naturally wooded areas, parks or large residential lots.
 - v. The area sampled must not be located immediately next to or within the area of a point source.
 - vi. An area with obvious vegetation damage must be avoided.
 - vii. The history of the area and adjacent land, including current and previous activities, must be considered and documented.
 - viii. An area sampled must not be:
 - (A) An area of added or imported fill, including soil and waste.
 - (B) A location near buildings, especially where paint chips may be present.
 - (C) A location where industrial or other contaminant generating activities are known to have taken place, including open garbage burning areas, vehicle parking and storage and material storage areas.
 - (D) A location near known air deposition sources, such as a foundry, coal-fired power plant or other air pollution source that may have deposited metals or other contaminants onto the soil in the area.

b. Sampling, Analysis and Evaluation of Data.

Background shall be established by a sampling methodology that is statistically valid and consistent with the methodology used to perform the fill determination. Where appropriate, analysis methods for background samples must be the same as the methods used for performing the fill determination.

The analytical results of background samples must be compared with the results obtained from the fill determination. The comparison must be made using one of the following statistical methods:

- i. The person shall demonstrate that the highest measurement from the donor site is not greater than the highest measurement from the receiving site. The Department may accept insignificant variances in numbers. The minimum number of samples to be collected is 10 from the receiving site and 10 from each donor site.

- ii. The Department may accept another appropriate statistical method if it meets the requirements below.
 - (A) For nonparametric and parametric methods, the false-positive rate for a set of data applied to a statistical test may not be greater than 0.05. The minimum number of samples to be collected is 10 from the receiving site and 10 from each donor site.
 - (B) For parametric methods, the censoring level for each non-detect (ND) shall be the assigned value randomly generated that is between zero and the limit related to the primary quantitation limit (PQL).