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Washington State Department of Ecology

Guidance for Clean Closure of Dangerous Waste Facilities

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1.0 CLEAN CLOSURE REQUIREMENTS

1.1 PURPOSE

The purpose of this document is to provide technical guidance for clean closing dangerous waste management units at Interim and Final Status Treatment, Storage and Disposal Facilities. This document provides specific direction for cleanup and removal of wastes in soil, concrete, and above-ground storage tanks and for demonstrating that clean closure standards are met. This guidance can be used to assist in determining sampling strategies, cleanup techniques and cleanup levels, analytical techniques, and statistical methods for clean closure of dangerous waste management units. Alternative methods to those presented here can be used if approved by Ecology.

In addition to providing guidance at the time of closure, the elements of this guidance should be addressed in the facility's closure plan. Minimum requirements for final status closure plans for final status facilities are contained in WAC 173-303-610 (3)(a)(i-vii) and requirements for interim status facilities are referenced in WAC 173-303-400(3)(a).

Post-closure monitoring is required when wastes are left in place at a dangerous waste management unit. This guidance does not address these situations. In addition, closure administrative procedures are not included in this document.

1.2 AUTHORITY

Owners and operators of dangerous waste facilities must comply with the Federal Resource Conservation and Recovery Act (RCRA) and its implementing regulations in Chapter 40 CFR, including 40 CFR Part 264 and 265. The Washington State Department of Ecology has been authorized to implement these regulations in Washington and has adopted regulatory language in Chapter 173-303 WAC. Sections 610 through 680, and section 400 of Chapter 173-303 WAC provides specific regulatory requirements for the closure of dangerous waste facilities.

1.3 CLEAN CLOSURE PERFORMANCE STANDARD

Clean closure will require the removal of all dangerous waste constituents including contaminated containment system components, contaminated soils, and other contaminated structures and equipment at a dangerous waste management unit. Dangerous waste constituents

in all media will be removed or decontaminated to the cleanup levels established by WAC 173-340-700 through 760 WAC, excluding Section 745. Cleanup levels will be established using Method A, or B, as defined in Chapter 173-340 WAC. MTCA

The basis of Chapter 173-340 WAC is cleanup to health-risk based levels, however, in addition, requirements of this chapter utilize a combination of background, practical quantification levels, and other applicable and relevant state or federal laws to establish cleanup levels. For purposes of demonstrating clean closure, there is no point of compliance in the dangerous waste management unit as discussed in WAC 173-303-645(6)(a) or as defined in WAC 173-340-200. Instead, clean closure levels must be obtained throughout the unit and will include contamination released from the unit. groundwater point of compliance

The cleanup levels specified in WAC 173-340-740 for soils may be applied to concrete; however, the facility proponent may prefer to conduct individual risk assessments on concrete structures that will be left in place after closure. Cleanup levels and procedures for other bases, liners, or equipment encountered during closure will be handled on a case-by-case basis.

Method A = Background
Method B = MTCA
Method C = Cub

Method C of Chapter 173-340 WAC is not applicable to clean closure of dangerous waste management units because pursuant to WAC 173-340-420, cleanup actions which leave waste constituents in place that exceed Method A or B levels, require a periodic review no less than once every five years. Similarly, Method A of WAC 173-340-745 is not applicable to clean closure requirements because of the requirements of institutional controls.

The cleanup standards in WAC 173-340-700 - 760 (excluding 745) reference the following sections in Chapter 173-340: 130, 350, 360, 410, 440. These sections do not apply to clean closure.

The demonstration of clean closure must consider all dangerous waste constituents generated or managed at the facility. For commercial facilities managing a large number of waste streams or if waste streams are unknown or suspect, then analysis of the constituent list in Appendix IX of 40 CFR 264 may be appropriate. When groundwater monitoring is required by Ecology for purposes of confirming clean closure, the clean closure decision will be delayed until Ecology is satisfied that groundwater meets the clean closure level.

land based units ?

In some cases, constituent concentrations may have exceeded Chapter 173-340 WAC, Method A or B cleanup standards, prior to operations of the dangerous waste management units (i.e.,

preexisting background exceeds the appropriate MTCA standards for clean closure). In these cases, clean closure of individual units may occur so long as 1) all the dangerous waste constituents that originated from the unit are removed to appropriate cleanup levels and 2) at Ecology's discretion, any dangerous waste constituents remaining in the unit will be removed to the appropriate cleanup level through RCRA corrective action or through a MTCA or CERCLA action.

1.4 REMOVING CONTAMINANTS FROM THE SITE

Any project which is attempting to clean close by removal of waste material must fully describe, in the closure plan, each step in removing waste, contaminated equipment, and contaminated soil from the property and estimate volumes and type of waste that will be removed. This includes a description of staging and containerization of waste or reagents, equipment used, removal pattern and depth increments, loading areas or any other step critical to removal. The plan should clearly define how soil will be removed, stored, loaded and managed, both on the site and once it leaves the property.

In addition, efforts to minimize air emissions during treatment or loading, including volatiles and dust, should be described when applicable.

Wastes: All wastes, debris, and contaminated media generated through closure activities must be managed in accordance with applicable requirements in Chapter 173-303 and applicable Federal hazardous waste requirements. Specific waste management strategies for the facility must be presented in the closure plan or an addendum to the closure plan. Ecology requires facilities undergoing closure to practice waste minimization when developing closure management strategies.

For units which were used to manage listed wastes, wastes removed at closure will continue to hold applicable listings. Care should be taken to properly manage and dispose of dangerous wastes generated during closure, including proper application of State and Federal hazardous waste land disposal restrictions.

If a waste, waste residue, or other media does not designate as a dangerous waste constituent, but exceeds the detection limit for any dangerous waste constituent, and the material is to be removed from the site, then it must be disposed of at a municipal solid waste landfill in compliance with Chapter 173-304 WAC or a permitted dangerous waste facility. Disposal at a

landfill may only take place if the operator of the landfill and the County Health Department provide approval for disposal after reviewing the analytical results.

Contaminated Debris: EPA has promulgated rules governing the application of Federal hazardous waste land disposal restrictions to contaminated debris. These rules are effective in Washington and are presently being implemented by the EPA Region 10 in conjunction with Ecology. Debris are defined as contaminated materials with a particle size of greater than 60 mm (approximately 2.5 inches). Debris intended for disposal in the land, on or off site, must meet applicable land disposal restrictions (Federal Register, August 18, 1992).

Contaminated Environmental Media: Contaminated environmental media, such as contaminated groundwater or soil, may be subject to special management standards such as the "Contained In" policy. The contained in policy states that environmental media such as soils and groundwater which contain dangerous waste must be managed as if they are a dangerous waste until or unless they no longer contain a listed wastes, exhibit a characteristic or are delisted. Contaminated environmental media are deemed to no longer contain dangerous waste when the dangerous constituents in the media fall below site specific health-risk based levels and the media does not exhibit a dangerous characteristic. All decisions in application of this policy are made case-by-case at the discretion of Ecology. Facilities proponents which anticipate management of contaminated environmental media as a portion of their closure activities should plan on working closely with Ecology.

1.5 CERTIFICATION OF CLOSURE

Pursuant to WAC 173-303-610(6) a qualified, independent, registered Professional Engineer must certify closure of a dangerous waste management unit. In order to certify closure, the engineer shall be involved in sample location planning, sampling, and site reclamation activities.

2.0 SAMPLING AND ANALYSIS PLANS

2.1 PREPARATION OF A FIELD SAMPLING PLAN

Closure plans must contain a sampling and analysis plan. Each sampling and analysis plan should explicitly state the intent to define contamination to the full extent. An adequate sampling and analysis plan should include the following information and rationale for each selection:

- ✓ Sampling approach and methods including the rationale and methods used to determine where sampling will occur.
- ✓ Detailed description of sampling methods including references to the standard methods.
- ✓ Sampling locations and unique ID number for each location (if final location deviates significantly from plan, Ecology must approve);
- ✓ Sample container and preservation requirements;
- ✓ Laboratory analyses to be performed, including rationale for analyses, analytical techniques, and expected detection limits; constituents may include any found in WAC 173-303-9905 or 40 CFR 264 Appendix IX that may be at the facility or in the waste;
- ✓ Sampling and analysis procedures to verify decontamination of above-ground tanks and concrete containment systems and other media or equipment;
- ✓ Description of QA/QC procedures to be used.
- ✓ Description of what data will be reported to Ecology.
- ✓ Personnel safety procedures for decontamination.

In addition to these elements of a sampling and analysis plan, data quality objectives should be considered (see Section 8).

2.2 SELECTION OF CONSTITUENTS TO BE ANALYZED

Selection of the proper analytical constituents must reflect on-site operations during the waste management unit's life. In many instances, if a storage area only managed one or two

waste streams with similar dangerous constituents, a limited number of analytes may be selected. However, for commercial facilities which handle wastes with a large variety of dangerous constituents, the sampling may cover the entire suite of dangerous waste constituents in 40 CFR, Part 264, Appendix IX.

At Ecology's discretion, and depending on facility design and past management practices, a portion of the samples to demonstrate clean closure may be done for a list of indicator parameters instead of the full list of dangerous waste constituents generated or managed at the facility. The indicator parameters should be the most likely to have been released based on types and amounts of wastes accepted or generated at the facility. Final verification sampling must include the full suite of dangerous waste constituents that were generated or managed at the facility.

Selection of constituents should not only be based on knowledge of the wastes managed at the unit, but may also include other potential elements or compounds used at the facility which generated the waste. For example, soil underlying an F006 surface impoundment might also be analyzed for 1,1,1-trichloroethane, a solvent likely to be used at a plating facility. Some dangerous waste management units should also include degradation products as part of the analysis. An example would be vinyl chloride for a unit where chlorinated solvents were used.

2.3 IMPLEMENTATION OF A SAMPLING PROGRAM AND STATISTICAL ANALYSIS OF DATA

A sampling program should include sampling to determine the maximum horizontal and vertical extent of contamination from any unit undergoing closure and must encompass the maximum extent of the facility operation (WAC 173-303-610(3)(a)(ii). If any cleanup and removal efforts are needed on-site, sampling should be conducted again to confirm that cleanup levels have been obtained.

To determine the maximum extent of contamination, a grid system should be used. Each node of the grid is a sampling location with an assigned number. A grid system uses a regular pattern, either rectangular or triangular to determine regular sampling points. One variation of regular sampling would include linear sampling along a drainage-way, boundary or other linear dimension. Length of the grid interval should be based on either 1) size of potential hot spots of contamination at a unit, or 2) extent of variability of constituent levels of interest across the unit. If it is likely that hot spots are present, Gilbert (1987) is an appropriate reference for determining a grid interval based on the size of hot spots. An example of an area where it may be appropriate

to base a sampling strategy on size of hot spots is a tank storage area. Alternatively, the number of samples to be collected which ultimately determine the grid interval can be based on the mean and standard deviation of indicator constituents calculated from a pilot sampling study. The mean and standard deviation can then be used in the equation presented in Chapter 6 of EPA (1989a) to determine the number of samples to be taken.

Grid sampling density may vary across the unit, and may not include the entire unit depending on the level of concern of the Ecology representative based on what is known about past management practices at the facility.

In addition to sampling at the nodes of the grid, biased sampling should be conducted where there is evidence of potential for leaks or spills or potential for a dangerous waste constituent to migrate. Likely areas for biased sampling include: (1) containers, tanks, waste piles or any other units (such as appurtenant pipes) in contact with soil; (2) below any sumps or valves; (3) load or unload areas (4) storage units with underlying pavements or concrete that appears to be cracked or broken; (5) areas receiving runoff or discharge, such as a ditch, a swale, or the discharge point downgradient from a pipe. Evidence for additional areas of sampling would include: (1) visual or olfactory evidence of contamination; (2) knowledge, such as reports by employees, inspectors, or others, that releases had or may have occurred; (3) length of time the unit has been in existence, (4) entries into the unit operating record, and (5) soil gas surveys or soil borings.

For small units where there is some documentation of extent of contamination, biased sampling may be used exclusive of grid sampling.

For sampling to confirm that cleanup levels are met following removal or remediation, the grid approach outlined above is generally appropriate. Again, however, it may be more practical in very small units, and at Ecology's discretion, to require biased sampling only. The grid used to confirm clean closure should overlay contaminated areas discovered during the initial sampling at the unit.

To confirm clean closure, statistical tests as described in Washington State Department of Ecology's Statistical Guidance for Ecology Site Managers (1992) shall be used. Additional information on sampling statistics is available in U. S. EPA (1986b) and Schweitzer, et al. (1984).

3.0 DECONTAMINATION PROCEDURES FOR TANKS

3.1 DECONTAMINATING TANKS

The decontamination procedures discussed here are designed for metal tanks including ancillary components to the tank system, i.e., pumps, piping, etc. If fiberglass tanks need to be addressed, contact Ecology to discuss proposed cleaning procedures prior to closure plan submittal. This guidance does not apply to metal tanks that have contained radionuclides.

The sampling analysis plan within the closure plan will specify the personnel, equipment, and procedures which shall be used for rinsing and collection activities. This shall include personnel protection requirements, all equipment and operational specifications, cleansing agents, volume of washwater generated and special temporary waste accumulation/staging areas, including identification of their location, and final disposition of the tank. Refer to U.S. EPA (1985) for specifics on steam cleaning and high pressure washing.

All tank surface areas shall be visually inspected for cracks and other openings through which washing fluid may reach underlying soil. All identified cracks or openings shall be sealed with a sealant resistant to both water and any cleanser designated for use in the area.

The facility proponent shall maintain a record of all cracks identified. These records may consist of photographs and documentation identifying and describing location and dimension of cracks. If cracks have been identified or if there is any other indication that leakage has occurred, the tank must be removed and the soil, concrete, etc., underneath the tank must be evaluated.

The first step in tank decontamination is to remove all pumpable wastes from the tank and all residual sludge and bottom sediment must be scraped, shoveled, or otherwise removed from the tank to the fullest extent practicable (following WISHA/OSHA regulations).

Following waste removal, the interior of the tank and all appurtenances must be decontaminated. Typically this will be accomplished by backflushing the piping and tank with water or other appropriate solvent or cleaning fluid. Upon removal of the fluid, all metal tanks will be rinsed using either steam cleaning or high pressure wash (or an equivalent method) which contains an appropriate cleanser or solvent. All free liquids/solids shall be removed between each rinse by vacuum truck or equivalent means.

All waste and cleaning residues generated during this cleaning process shall be designated. Sludge, residue, and rinsewater that designates as dangerous waste will be treated or sent off-site to a permitted treatment, storage, or disposal facility. Tanks destined for metal scrap shall be rendered unusable prior to leaving the facility. If the tank is to be sold immediately and used for a similar purpose, then testing is not necessary, however, the applicant must document this transaction.

3.2 TANK CLOSURE PERFORMANCE STANDARD

To be considered decontaminated, the final rinsewater from the tank should have no dangerous waste constituents that were managed in the tank present in quantities that exceed levels in a rinsewater blank.

Wipe samples may be required to demonstrate the tank has been decontaminated if there are questions about whether the cleaning methods or solutions used removed all waste constituents stored or managed in the tank.

4.0 CONCRETE DECONTAMINATION PROCEDURES

Decontamination of concrete containment systems consists of scrubbing the surface, power washing, and then taking a surface chip sample to a depth of approximately 1/2-inch to confirm that the closure performance standard has been met. If the surface chip sample has contamination, a concrete core will be necessary to determine the extent of the contamination

Concrete containment systems with liners will be evaluated on a case-by-case basis. Ecology may use discretion on the amount of chipping and coring required for sampling and analysis to verify closure performance standards on a site-specific basis.

The sampling and analysis plan within the closure plan will specify the personnel, equipment, and procedures which shall be used for rinsing, scrubbing, and collection activities, including cleansing agents and volumes of washwater generated.

4.1 CLEANING PROCEDURES

At the start of closure, all surface areas shall be visually inspected for cracks and other openings through which washing fluid may reach underlying soil. All identified cracks or openings shall be sealed with a sealant resistant to both water and any cleanser designated for use in the area.

The facility proponent shall keep, as part of a field notebook, records of all cracks or openings identified in the concrete containment systems. These records may consist of photographs and correlating written documentation identifying and describing the location and dimensions of the cracks. These shall be identified as biased sampling locations.

Any areas which show visual signs of past spillage shall receive a preliminary cleaning. Scrubbing down an area with a cleaning solution is an example of an acceptable preliminary cleaning method. Any other method that is approved by Ecology is also appropriate. Containment areas may then be rinsed by steam cleaning or high pressure wash using an appropriate cleanser. Refer to U.S. EPA (1985) for specifics on steam cleaning and high pressure wash.

The extent of rinsing of concrete surfaces should be determined on a case-by-case. Care should be taken to avoid generating unnecessary quantities of rinsewater.

Rinsate and cleaning residue from rinsing operations shall be collected by vacuum truck or equivalent means. At no time shall rinsate and cleaning residue from incompatible or unlike waste management containment systems be commingled. All accumulated rinsate and cleaning residue shall be considered dangerous waste unless it passes the designation requirements of Chapter 173-303 WAC.

4.2 SURFACE SAMPLING OF CONCRETE

After rinsing operations have been completed, surface sampling of the concrete containment systems and sumps shall be undertaken. Each individual containment system and sump will be sampled. Surface sampling will be accomplished by collecting chips to a depth of approximately 1/2 inch from the surface of the containment system and sump. Where surface contamination is present or in areas containing constituents (i.e., solvents, etc.) that can permeate the concrete containment system or sump, Ecology may require core samples be taken through the concrete. The surface sample and core sample should be segregated and analyzed separately. Samples shall be analyzed for those dangerous waste constituents expected to be part of, or derived from, the waste historically managed within the unit. Sampling locations are discussed in Section 2.3. The number of samples collected must be sufficient to provide a representative measure of surface concentrations.

If a sample designates as a dangerous waste pursuant to Chapter 173-303 WAC, then the area represented by the sample (subunit) shall be considered to be a dangerous waste. Subunits should be established in the sampling and analysis plan. Ecology may verify sample results by either resampling and analysis of a new sample from the same location as the sample in question or by analysis of the remaining sample split.

Concrete structures that remain on-site must be evaluated for clean closure requirements (using chipping and coring) in accordance with WAC 173-340-740 or alternatively, the facility proponent can conduct a risk assessment for the structure.

5.0 SOIL SAMPLING

Sampling locations within the dangerous waste management unit will typically be located over structures as well as exposed soil. Where the grid system for sampling the unit overlies concrete structures, the soil underlying the concrete will be sampled to check for the presence of contamination caused by facility operation, following cleaning of the concrete but before removal. Sampling of soils will be done through holes bored in the overlying concrete. This avoids soil disturbance likely to arise when the concrete is removed. Additionally, concrete borings must be made in a manner to minimize disturbance to the underlying soil. Procedures will be subject to approval by Ecology.

Concrete structures should not be removed until after Ecology has reviewed soil analytical data. After concrete removal the underlying soil shall be subject to inspection by Ecology. Areas under documented spills and areas susceptible to releases will receive close scrutiny. Indications of irregular coloration of soil, the presence of wet areas, volatile emissions detected on field detection equipment, odor or other signs of potential contamination may trigger additional sampling and testing if these areas are not already sufficiently characterized in Ecology's judgement.

The interval for sampling soil at various depths may be dependent on several factors, including: (1) soil type and permeability; (2) suspected magnitude of surface contamination; (3) physical state of the waste and its mobility; (4) groundwater level; (5) length of time that waste was present at the site; and (6) relative toxicity of the waste. If surface samples demonstrate contamination, then sampling should be conducted at depth to determine the extent of contamination.

For further information on soil sampling consult U.S. EPA (1986b), U. S. EPA (1984), and Schweitzer, et al. (1984).

6.0 GROUNDWATER MONITORING

In the event of confirmed or potential soil contamination, verification groundwater monitoring may also be required through the closure plan. If the unit is already subject to ground water monitoring requirements, the well location, frequency of sampling, or constituents for groundwater sampling may be modified for a period of time beyond completion of a clean closure to verify the effectiveness of closure activities. The length of verification monitoring required shall be decided on a "case-by-case" basis taking into account hydrogeologic conditions, waste characteristics, and other factors. Closure will not be certified until it is clear that clean closure levels are obtained. When groundwater is contaminated, post-closure monitoring will generally be required. For further information on evaluating groundwater, refer to U.S. EPA (1988).

7.0 ANALYTICAL METHODS

7.1 ANALYTICAL METHODS

The methods used for sample collection, sample preservation, transportation, allowable time before analysis, sample preparation, analysis, method detection limits, practical quantification limits, quality control, quality assurance and other technical requirements and specifications shall comply with the following requirements as applicable (from Chapter 173-340 WAC).

Method 1. Test Methods for Evaluating Solid Waste, Physical Chemical Methods, Third Edition, US EPA, SW-846 and any revisions or amendments thereto;

Method 2. Methods for Chemical Analysis of Water and Wastes, U.S. EPA, EPA-600/4-79-020 and any revisions or amendments thereto;

Method 3. Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act, 40 CFR 136 and Appendix A, B, and C, U.S. EPA and any revisions or amendments thereto;

Method 4. Standard Methods for the Examination of Water and Wastewater, American Public Health Association, American Water Works Association and Water Pollution Control Federation and any revisions or amendments thereto.

Method 1 should be used to determine contaminant levels in soil and solid waste. Methods 1, 2, 3, and 4 may be used to determine contaminant levels in groundwater for confirmational monitoring.

7.2 MULTIPLE METHODS

Where there is more than one method specified in subsection 7.1 of this section with a practical quantification limit less than the cleanup standard, any of these methods may be selected. In these situations, considerations in selecting a particular method may include confidence in the data, analytical costs, and considerations relating to the quality assurance or analysis efficiencies.

Tests for which methods have not been specified in this section shall be performed using standard methods or procedures such as those specified by the ASTM when available.

Ecology may require an analysis to be conducted by more than one method in order to provide higher data quality.

8.0 QUALITY ASSURANCE AND QUALITY CONTROL REQUIREMENTS

During a closure investigation, samples must be collected and analyzed with sufficient quality assurance and quality control (QA/QC) procedures in order to ensure representative and reliable results. The validity of both sampling techniques and laboratory analytical procedures must be assured so that the data from sampling activities can be used to accurately assess the presence or absence of contamination at the site.

Before any sampling is conducted, facility proponents should consider data quality objectives, which are statements of the precision, bias, representativeness, completeness, and comparability of the data necessary for the data to serve the objectives of the project. Guidance on data quality objectives and other elements of a sampling and analysis plan are found in the Department of Ecology's Guidelines and Specifications for Preparing Quality Assurance Project Plans (1991), which is available from the Environmental Investigation and Lab Service, Quality Assurance Section.

8.1 LABORATORY QUALITY CONTROL/QUALITY ASSURANCE

At the present time, Ecology has a list of accredited laboratories for performing water analyses, including groundwater analyses. All surface water and groundwater samples taken to document compliance with the regulations implemented by Ecology must be submitted to a laboratory accredited under Chapter 173-50 WAC. A listing of laboratories accredited to perform water analyses may be obtained from Ecology's Environmental Investigations and Laboratory Services Program (EILS).

A similar accreditation program for soil analyses does not presently exist, but is anticipated to be established within the next few years. In the meantime, we recommend that all solid matrix samples be analyzed in a lab accredited by Ecology for water analyses.

Analytical methods specified in Section 7 require similar QA/QC to Ecology's Manchester Lab. These requirements include analysis of check standards, duplicate samples, spike samples, and blanks should be routinely run because they provide information for interpreting the accuracy, precision, and detection capabilities of the analytical procedures used. Check standards are used to estimate the precision of the method and to check for bias due to calibration. Duplicate analyses of samples are used to check the precision of the actual samples. Spikes are used to test for bias due to chemical interference. Blanks are used to estimate the limit of detection of

the method and to check for laboratory contamination. QA/QC methods must be specified in the closure plan.

Facility proponents conducting clean closure must obtain from the laboratory the QA/QC results run with each batch of laboratory analyses performed for addition to the detailed records of the closure demonstration. QA/QC data is to be reviewed by the person conducting closure demonstrations and ultimately delivered to the owner along with the other documented results of the site check or site assessment.

Environmental Protection Agency Contract Lab Procedures (CLP) developed for the Superfund Program, employ an extensive printout of data with corresponding QA/QC results. The CLP reporting format can be a useful reporting format if there are extensive quantities of data to be reviewed, however it is expensive and only a few labs in the state have CLP contracts. Moreover CLP does not have a bearing on the quality of the data. Use of CLP will be impractical for most closures in the state but may have applications for large facility closures.

U.S. EPA (1986a) has a well thought out full menu of QA/QC options. As an alternative to CLP, a facility proponent may request the lab manager to submit all QA/QC data with sample data. Quality Assurance/QC data should be kept as part of the operating record of the facility.

8.2 DOCUMENTATION OF FIELD ACTIVITIES AND QA/QC IN THE FIELD

A field notebook must be used by the person conducting a closure to record times, dates, and locations of all samples as well as daily events, observations, field measurements, and any other applicable information obtained during the field investigation. All entries should be made in ink, signed, and dated. Photographs should be taken of each sampling location and of any unusual circumstances encountered in the investigation. Field notebooks and photographs should be kept for a minimum of five years to help reconstruct sampling procedures and to aid, if necessary, in legal testimony.

Additional information on documentation and custody can be found in U.S. EPA (1984), U.S. EPA (1986a).

9.0 REFERENCES

American Public Health Association, American Water Works Association and Water Pollution Control Federation, Standard Methods for the Examination of Water and Wastewater.

American Standard Testing Methods, 1916 Race Street, Philadelphia, PA 19103.

Gilbert, R.O., 1987, Statistical Methods for Environmental Pollution Monitoring, Van Nostrand Reinhold Company, New York, NY, 320 pp.

Schweitzer, G.E., and J.A. Santolucito, 1984, Environmental Sampling for Hazardous Wastes, ACS Symposium Series No. 267, American Chemical Society, Washington, D.C.

U.S. EPA, 1985, Guide for Decontaminating Buildings Structures and Equipment at Superfund Sites, U.S. EPA, Cincinnati, 600/2-85/028, March 1985.

U.S. EPA, 1986(a), Test Methods for Evaluating Solid Waste, Vol. 1 (Lab Manual), EPA OSWER SW-846, Third Edition and Subsequent Updates.

U.S. EPA 1986(b), Test Methods for Evaluating Solid Waste, Vol. 2, EPA OSWER SW-846, Third Edition and Subsequent Updates.

U.S. EPA, 1988, Methods for Evaluating the Attainment of Cleanup Standards — Volume 2: Groundwater. Draft 2.0, U.S. Environmental Protection Agency.

U.S. EPA, 1989(a), Methods for Evaluating the Attainment of Cleanup Standards — Volume 1: Soils and Solid Media, EPA 230/02-89-042, U. S. Environmental Protection Agency Office of Policy, Planning, and Evaluation, Washington, D.C.

U.S. EPA 1989(b), Soil Sampling Quality Assurance, EPA 600/8-89/046, U.S. Environmental Protection Agency, Environmental Monitoring System Laboratory, Los Vegas, NV.

U.S. EPA, Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act, 40 CFR 136, and Appendices A, B, and C.

U.S. EPA, Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020.

Washington State Department of Ecology, 1991, Guidelines and Specifications for Preparing Quality Assurance Plans, Environmental Investigation and Laboratory Service Program, Washington State Department of Ecology, Document 91-16.

Washington State Department of Ecology, 1992 Statistical Guidance for Ecology Site Managers, Toxics Cleanup Program, Document 92054.

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