RCRA CLOSURE HANDBOOK

A GUIDANCE DOCUMENT PREPARED FOR HAZARDOUS WASTE FACILITIES UNDERGOING CLOSURE, BY THE HAZARDOUS WASTE DIVISION OF THE ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY.

April 2010

NOTICE

This document has been prepared to assist individuals in understanding the closure requirements of the Arkansas Department of Environmental Quality hazardous waste regulations. It is not intended as a substitute for the regulations and should not be used as such. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

CLOSURE HANDBOOK

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GENERAL OVERVIEW OF THE CLOSURE PROCESS

What is closure and why is a closure plan required?

"Closure" of a hazardous waste treatment, storage, or disposal unit refers to the process by which the unit is secured, at the end of its use in hazardous waste management, to prevent or minimize future impacts to human health or the environment. The unit may either be completely decontaminated or treated so that exposure to the remaining contamination is minimized. The closure period is the time period from receipt of the final volume of hazardous waste at the facility to the time when the facility is certified closed.

There are two ways to approach the closure of a contaminated site: 1) closure by removal (clean closure) and 2) risk-based closure. Clean closure occurs when all hazardous wastes and any associated contamination at the facility are removed to the extent that laboratory analysis shows the contaminants remaining are either below the detection limits of the analytical method or below background levels. Risk-based closure occurs when a facility leaves any amount of contamination in place at the site, but it is determined it is of no danger to human health or the environment through the use of drinking water standards and health-based levels.

A closure plan is used to establish the procedures that will be performed during closure and is required when a contaminated site or a hazardous waste management unit is closed by a facility voluntarily or as a regulatory requirement. Following an approved closure plan helps to assure that the closure of the site will be protective of human health and the environment.

What is a closure plan and what does a closure plan contain?

A closure plan is a document that: (1) describes the active history of a site and type(s) of contaminants existing there; (2) details in writing and in graphical form the procedures that will be followed to achieve contaminant removal and closure; (3) provides a step-by-step sampling and analysis plan including proposed sampling locations and analytical parameters and methods; and (4) identifies the cleanup (for clean closure) or containment (for risk-based closure) standards which must be achieved to obtain acceptance of closure certification by ADEQ.

The five basic components of a closure plan are:

(1) Facility Description and History;
(2) Waste Removal and Decontamination Procedures;
(3) Waste Sampling and Analysis Procedures;
(4) Closure and Inspection Schedule; and
(5) Closure Cost Estimate and Financial Assurance Demonstration (Refer to Appendix A).

Certification of closure, which is required for all types of closure, and submittal of a new survey plat and recording of a notice on the deed, which are required for some risk-based closures, are considered part of the closure process.

Which State of Arkansas regulations address closure?

The regulations governing all hazardous waste activities are contained in Arkansas Pollution Control and Ecology Commission Regulation No. 23 (APC&EC Regulation No. 23). The requirements for closure of a permitted hazardous waste treatment, storage or disposal unit or contaminated site are contained in APC&EC Regulation No. 23, Section 264.110-120 Subsection G (NOTE: For interim status units, the requirements are contained in APC&EC Regulation No. 23, Section 265.110 Subsection G). The requirements and procedures for groundwater monitoring are contained in APC&EC Regulation No. 23, Section 264.90. For interim status units, the requirements are contained in APC&EC Regulation No. 23, Section 265.90. These

regulations may be viewed on the ADEQ website at http://www.adeq.state.ar.us or hard copies may be obtained for a nominal fee by contacting Program Branch of the Hazardous Waste Division at:

Arkansas of Environmental Quality
Hazardous Waste Division
ATTN: Program Branch Manager
5301 Northshore Drive
North Little Rock, AR 72118
(501) 682-0854

The Technical Branch of the Hazardous Waste Division (HWD) of ADEQ regulates hazardous waste activities, including closure activities. The HWD may be contacted by phone at (501) 682-0833 or by writing to the above address; attention to the Technical Branch Manager. Please note that this handbook is intended as guidance only and is not to be used as a substitute to the applicable regulations.

Now that a plan has been written, what do you do with it?

Once a closure plan is written, one hard copy and one electronic copy should be submitted to the HWD of ADEQ where the plan enters the review process. The Technical Branch of the HWD will comment on the plan, if any information is missing. The review process continues until the closure plan is determined to contain all information required by the regulations. If the review process is unsuccessful, the closure plan may be revised by ADEQ pursuant to APC&EC Regulation No. 23, Section 264.112 (c)(3), Section 265.112 (d)(4), Section 270.42 (b)(6)(i)(A), and 270.42 (c)(6). The revisions will be itemized in the letter which is sent to the facility to inform them that the plan has been modified and, by virtue of ADEQ's modifications, determined complete.

When the plan is determined to be complete, it is placed on public notice by the ADEQ for thirty days. During this time, the public and the facility are allowed to review the closure plan and provide comments. Once all public comments, if any, have been resolved, the ADEQ will either approve the plan for implementation or modify and approve the plan.

What happens if clean closure cannot be attained?

If, once closure according to the approved plan is complete, it is determined that clean closure cannot be achieved, then the site and any contaminated areas are considered to be landfills, and must be closed in accordance with the requirements of APC&EC Regulation No. 23, Section 264.310 or 265.310 (interim status), as applicable. If and when this determination is made, the facility must notify the ADEQ and submit a request to modify their closure plan to close-in-place. The facility must also apply for a post-closure permit to perform post-closure care, monitoring, and possibly corrective action for the site. This post-closure period may be 30 years or greater.

What activities can be conducted prior to plan approval?

Removal of waste inventory can occur at any time. The facility must ensure compliance with all applicable regulations including those pertaining to generation and transportation of hazardous waste, such as waste determinations, manifesting, and land disposal restrictions (APC&EC Regulation No. 23, Section 262.10 through 262.13 (General); Section 262.20 through 262.24 (Manifest); Section 262.30 through 262.36 (Pre-Transport Requirements; Section 262.40 through 262.44 (Recordkeeping); Section 262.50 through 262.58 (Export); Section 263 (Transporters); and Section 268 (Land Disposal Requirements)). Other activities, such as sampling and soil removal, should not be performed until the plan is approved by ADEQ.

TIMELINE FOR CLOSURE

The time required to complete closure of a contaminated site can vary greatly depending on the size of the site, the amount of contamination, the types of waste and the types of media that are contaminated. This section will provide an outline for scheduling closure activities and supply information on how much time a facility can expect to spend in each step of the closure process.

How does a facility know when to submit a closure plan?

Regulations require facilities that wish to or are required to close a hazardous waste management unit to have an approved closure plan before closure is performed. If a plan has not been previously approved for a facility either under interim status, permitting or generator requirements, a plan must be approved before closure can occur. For example, a facility would be required to prepare a closure plan if, during a routine inspection, a small quantity generator is found to have a hazardous waste treatment, storage (other than the less than 90-day generator accumulation area), or disposal unit. The ADEQ usually allows 30 to 60 days for preparation of a closure plan. The length of time is specified by the ADEQ when the facility is notified that a closure plan is required. A closure plan may be required by an administrative order or may be requested in a formal letter from the ADEQ. When the HWDreceives the facility's closure plan the review process formally begins.

What is included in the ADEQ's review process?

The ADEQ's review process allows for a closure plan to be reviewed and revised twice. Ideally, the closure plan can be approved at this time. If the plan is not complete, administrative measures may be taken. The time it takes for the ADEQ to review a plan depends upon the initial completeness of the plan and the size and complexity of the site slated for closure. The review time is also affected by the workload assigned to the reviewing engineer. Each time the plan is reviewed, the engineer prepares a list of comments detailing any deficiencies or missing information discovered during his/her review of the plan. This list of review comments (called a Notice of Deficiency or NOD) is sent to the facility as a guideline detailing what information should be added or removed from the plan so that it will contain complete information. Each NOD is accompanied by a letter providing the length of time allowed for the facility to respond to the comments and submit a revised plan. It is the responsibility of the facility to have the plan revised according to the comments and resubmitted to the ADEQ within the allotted time. Failure or refusal to provide adequate, timely responses to the NOD comments may lead to enforcement action (which may include the imposition of monetary penalties) by the ADEQ. The facility is usually given 30 days to respond to the first NOD and 20 days to respond to the second NOD. If any subsequent NODs are necessary, enforcement action may be taken by the ADEQ. If the extent of the comments is such that the plan cannot be revised within the allotted time, a written request for a time extension may be submitted before the scheduled due date. The facility should also contact the reviewing engineer by telephone to alert him/her of the request.

How long is the public comment period?

After the ADEQ has reviewed the closure plan and all revisions and has determined that all necessary information has been included, the ADEQ will inform the facility that the latest revision of the closure plan submitted to the ADEQ has been determined complete. Once determined complete by the ADEQ, the plan will be made available for review and comment by the public for 30 days. A legal notice will be placed in the local paper to notify the public of its opportunity to comment. A copy of the closure plan will be placed in a library, town hall, courthouse, or other public repository in the same community as the facility (or the town nearest to the facility if the facility is rural) so that it may be reviewed by interested members of the public. If there is substantial public comment, or if specifically requested, a public hearing may be held. Once the public comment period has expired, the ADEQ will review all public comments received during

the public notice period and at the hearing, if one is required. The closure plan may be required to be revised again based upon the comments received--especially if they divulge new or previously overlooked information about the facility. Once the closure plan has been re-examined in light of the public comments and found to either be adequate or modified to reflect the public comments, the plan is ready to be approved. The plan will be approved or disapproved within 30 days of the end of the public comment period. If disapproved, the ADEQ may modify and approve the plan pursuant to APC&EC Regulation No. 23, Section 270.42 (b)(6)(i)(A) and Section 270.42 (c)(6).

How much time is allowed for completion of closure activities?

If a facility has an approved closure plan in place (such as a permitted facility or an interim status facility with a closure plan approved under the interim status requirements), then that facility must give notice to the ADEQ at least 60 days prior to the start of closure activities. For all facilities that are under closure as a part of an administrative order or other ADEQ action, the ADEQ will assume that closure will begin as soon as the closure plan is approved unless the start of closure is constrained by a Legal Order or other legal action. If there will be a delay between the approval of the plan and the commencement of closure activities, the ADEQ should be notified.

All facilities must complete closure activities within 180 days from the date that the closure plan is approved (or the start of closure activities for facilities with previously approved plans) unless a different schedule is approved in the closure plan. For some facilities completion within 180 days can be difficult or even impossible. A facility with a large quantity of waste remaining on-site that must be removed and disposed of off-site may need additional time to accomplish the waste removal. The ADEQ will allow time extensions on a case-by-case basis for facilities facing large clean-ups. A time extension can be requested in a letter to the Chief of the HWD and should specify the amount of time required by the facility to complete closure as outlined in the approved plan. The request will be considered and, if the ADEQ determines the request to be reasonable and that the delay is beyond the control of the facility, the time extension will typically be approved. A favorable extension is dependent on whether or not the facility made the request prior to the expiration of the deadline.

When is a closure certification submitted to the ADEQ?

For a facility with only one hazardous waste management unit undergoing closure activities, the facility should submit certification documents to the ADEQ within 60 days of the completion of closure activities. If concurrent hazardous waste unit closures are occurring on site, each closure should be certified separately and within 60 days of the closure of that particular unit. In addition to the certification of closure for each unit, the closure of the entire facility should be certified within 60 days of the closure of the last unit (for multiple-unit facilities).

When is a facility required to submit a survey plat and place a notice on the property deed?

In the event that a facility cannot accomplish clean closure by removing all hazardous waste located on-site (this includes soil and groundwater contamination), a survey plat should be prepared which shows the horizontal and vertical extent of any remaining waste(s). This plat should be submitted to the local zoning authority no later than the submittal of the certification of closure. A note should also be placed on the property deed no later than the closure certification submittal to the ADEQ, stating that hazardous wastes or hazardous waste residues remain on the property.

GENERAL FACILITY DESCRIPTION AND HISTORY

The purpose of the general facility description is to provide basic understanding of the facility, its location and relation to affected communities, and the activities that are occurring or have occurred at the site. This section should contain information concerning the unit that is to be closed including, but not limited to, wastes managed, maps, process descriptions, locations of spills, etc. This information will provide a list of probable waste types that may require removal from the closure site. This information should be included even with closure plans that are contained in a complete Part B permit application because the closure plan is supposed to be a "stand alone" document.

The following information should be included in this portion of the plan:

1) The physical location of the facility including city and/or county. The section, township, range, latitude and longitude of the facility should also be included.

2) The physical location of any regulated units at the facility, and information on areas requiring specialized attention such as known spills, leaks, etc.

3) A topographic map in accordance with the regulations provided in APC&EC Regulation No. 23, Section 270.13(l), Section 270.14(b)(19), and Section 270.240(s). including a wind rose, flood zones, seismic areas, fault zones, bodies of water and water supply wells (including private wells) within 1000 ft. of the facility (unless otherwise specified).

4) A brief history of the facility and the unit(s) at the facility to be closed under this closure plan. This history should include any previous property owners and any previous uses of the property.

5) A description of the historical and current processes at the facility and a description of the processes that apply to the specific unit(s) being closed.

6) The maximum amount of waste that has ever been managed on the intended closure site and the maximum amount of waste currently managed at the unit(s) being closed (for example: the number of 55 gallon drums stored there and/or the in-place volume of the waste pile/landfill/surface impoundment, etc.).

7) A description of the different types of wastes handled at the facility and at the unit(s) being closed (common name, waste codes, quantities, etc.).

8) A description of any remediation efforts (including other closures, corrective measures, post-closures, and groundwater monitoring activities) that have been conducted or are in progress at the site.

The eight topics listed above provide only the *minimum* information required by the ADEQ to describe a facility in the closure plan; therefore, if any additional information is required to fully describe the site, it should also be included in this section.

UNIT DECONTAMINATION

This section of the closure plan should include a complete workplan detailing methods for the decontamination of the hazardous waste management units (tanks, containment areas, concrete pads, etc.). Several means of decontamination are available. The method for decontamination obviously depends on the materials of construction and location of the particular unit in question. The plan should contain a sufficient level of detail so that it can be properly interpreted and followed by facility, contractor, certifying engineer, and ADEQ personnel.

Non-Porous Surfaces

Decontamination of non-porous surfaces such as tanks and metal piping may be accomplished by washing. Tanks may require entry procedures for a confined space. A detergent may or may not be employed. Steam cleaning is another option. The efficient removal of hazardous waste residues is the goal. After cleaning, the tank must be sampled for analysis. Sampling requirements are discussed elsewhere in this handbook.

Porous Surfaces

Porous surfaces provide a unique problem for decontamination. If a surface like concrete (i.e., a container storage pad) has been coated with an impervious coating prior to and during its service as a hazardous waste management unit, steam cleaning or detergent washing may be sufficient for complete decontamination. However, if the coating has been compromised or was added after management operations began, the concrete may have hazardous waste residues in the concrete matrix. If steam or detergent cleaning is insufficient, removal of all or part of the concrete may be necessary. The facility owner or operator should determine which is more economically feasible: complete removal of the concrete or removal of layers of the concrete. Methods are available for removing layers of concrete without demolishing the entire concrete slab. The costs for disposal of the volumes of concrete generated, the costs for labor involved, and analytical costs for proper disposal should be taken into consideration. The main goal of the process is to remove contamination in the most efficient manner possible.

Soil

In order to achieve clean closure, all contaminated soil must be removed from the site. Surface soil can usually be removed and disposed. Subsurface soil provides several problems, including accessibility. Methods are available for treating soil in-situ. However, treatment of soil in situ is considered part of the post-closure and corrective action process and would not be part of a closure plan. A means of determining the amount and the areal extent of soil to be removed should be provided in the closure plan. For example, if a volume of soil has been removed and analysis shows that contamination is still present in the soil, the plan should describe how the facility decides how much soil to remove and from what portions of the excavation the soils will be removed.

Groundwater

If soils have been impacted or if the unit is constructed in a manner that may impact soils or groundwater, groundwater sampling will be required in order to make a clean closure determination.

Organization

The unit clean up portion of the closure plan should be organized such that the ultimate goal of decontamination can be achieved in the most efficient manner. In other words, the closure plan should allow for additional removal of soil or additional cleaning of concrete, etc. without requiring approval from ADEQ for the additional steps. In evaluating the closure process, the ADEQ is concerned that the final results of closure are achieved (i.e., the removal and proper disposal of hazardous wastes and residues, decontamination of the site and equipment, etc.), as well as with assuring that the closure takes place in a manner that meets all applicable regulations. The closure plan should provide sufficient detail of the iterative or other removal/ decontamination sequence to ensure that applicable regulations are addressed and that the final cleanup standards will be achieved.

EQUIPMENT DECONTAMINATION

One important part of closure is the process of equipment decontamination or cleaning. All equipment and systems used to manage hazardous waste at the site and used in clean-up at the site must be decontaminated. APC&EC Regulation No. 23, Section 264 and Section 265 (interim status), as applicable, states that the closure plan must include a detailed description of the steps needed to decontaminate all hazardous waste residues and contaminated containment system components, equipment, structures, and soils during partial and final closure including, but not limited to, procedures for cleaning equipment and removing contaminated soils, methods for sampling and testing surrounding soils, and criteria for determining the extent of decontamination necessary to satisfy the closure performance standard (see Waste Sampling and Analysis for Closure section regarding closure performance standard). This section will include the steps, at a minimum, that should be performed in the decontamination process. Decontamination should be carried out in such a way as to not contaminate new or previously cleaned areas.

Decontamination Pad

A decontamination pad is used for containing the wash fluids and debris that are generated during the cleaning of equipment or materials such as that used in the clean up of the site. For instance, the decontamination pad would be used as an area to wash a backhoe or a drilling rig so that any contaminated wash water or soils would be contained and not contaminate a new area. Information presented in the closure plan about the decontamination pad should include, at a minimum, the material that will be used to construct the pad, secondary containment for the pad, the sump(s) used to collect and to remove the decontamination rinsate, all collection systems employed, and the location of the pad at the site. There are two major concerns about the actual construction of the pad. First, the pad must be constructed in an area free of gross surface contamination; and, second, the pad must retain the site contaminants and decontamination fluids for future removal and testing. Once decontamination is completed at the site, the pad and related appurtenances must be disposed of in compliance with all applicable ADEQ Administrative Codes. Therefore, the closure plan should also describe the disposal of the decontamination pad components. Some items (e.g., concrete slabs, tanks, etc.) may have to be decontaminated in place. If this is the case, the methods of collection of the decontamination fluids or other residues should be thoroughly discussed.

Decontamination Procedures

The closure plan should also include a detailed decontamination procedure. This procedure should provide a step-by-step method to be followed to accomplish decontamination of all contaminated equipment and materials. This must include, but is not limited to, the types of detergents, water (e.g., tap/potable, deionized, organic-free), and solvents (e.g. pesticide-grade Isopropanol) to be used. The order in which the different types of water, detergents, and solvents are to be used should be set forth in the decontamination procedure.

Since the degree of contamination and size of equipment at the site can vary greatly, the degree of decontamination necessary to meet the performance standards and the procedures to accomplish decontamination will also vary. For example, equipment used to manage or remove waste at the site may require more extensive decontamination than equipment used for soil removal or sampling at the site. If there are criteria to determine the extent or type of decontamination certain equipment will require, these criteria should be included in the closure plan.

The closure plan should also include steps to be taken to decontaminate personnel coming out of the “Hot Zone” into the “Cold Zone”. The decontamination station in the “Transition Zone”, its location, and substances used for decontamination should all be detailed in this section. The

types (level) of personal protective equipment (PPE) to be worn by the personnel performing the decontamination and the disposal of used PPE should be discussed in detail in the closure plan.

Once the closure plan is approved by the ADEQ, the decontamination procedures set forth in the plan should be strictly followed.

Verification of Decontamination

Once a piece of equipment is decontaminated, its cleanliness must be verified. To verify decontamination one must take appropriate quality assurance/quality control samples. The amount and type of these samples will vary with the size, material, and both past and future use of the equipment in question. These samples could be in the form of a visual inspection, wipe samples, chip samples, etc. The decontamination procedures should therefore include a detailed sampling and analysis plan that would be applicable for all materials that are to be decontaminated.

Decontamination Fluids

All decontamination fluids generated during the decontamination processes must be contained and sampled before the proper disposal determination(s) can be made. A plan must be developed to determine the number of samples and constituents to analyze in order to characterize the decontamination fluids. This characterization will aid in the determination of the disposal method for the fluids. Depending on the test results from the fluid samples and requirements of applicable permits and regulations, the decontamination fluid may be sent to a publicly owned treatment works (POTW), may require disposal as a hazardous waste, or may be disposed of in another manner.

WASTE SAMPLING AND ANALYSIS FOR CLOSURE

What is a sampling and analysis plan and why is it required?

A complete closure plan requires a thorough sampling and analysis plan for both wastes that remain on-site and media affected during operation of the unit. A Sampling and Analysis Plan (SAP) describes the steps that the facility will take to demonstrate clean closure has been accomplished. The SAP should include provisions for sampling and analyzing any potentially contaminated materials such as wastes that have been removed, equipment, containment structures, and contaminated media to ensure proper disposal. This plan should include: the number and type of samples that will be collected and their location and depth at the site; a listing of constituents to be analyzed; the testing procedures that will be used; and how clean closure will be verified (i.e., clean closure criteria). This plan should also include an indicator parameters/analytes list, chosen from the list of contaminants historically managed at the site that will be used to determine if the extent of site clean-up is sufficient prior to costly verification sampling. The selected analytical methods should be outlined in the plan. These methods should be approved by ADEQ. The plan should also include a laboratory QA/QC plan and should provide a listing of the QA/QC procedures that will be followed during analysis (i.e., matrix spikes, duplicates, etc.).

The intent of a sampling and analysis plan is to ensure that complete waste removal is achieved. Initial sampling and analysis of the site may be required to develop a complete list of hazardous wastes and their constituents at the site so the correct closure action can be chosen and implemented. If an approved closure plan is not in place, all wastes and contaminated media should be sampled initially to formulate the analyte list for final confirmation sampling. Information from the wastes that have been managed, if available, may be used in developing the analyte list. Knowing exactly what these constituents are allows the facility to prove, during final confirmation sampling, that all constituents have been removed from the affected area after closure activities are complete. Sampling of the soils and groundwater left in place following removal of contaminated media allows the facility to certify the site as clean closed (provided that all wastes and residues have been removed); therefore, precluding post-closure care or monitoring. Sampling also serves to delineate the extent of contamination remaining in place in the event of closure-in-place, and is necessary for legal documentation purposes (i.e., notice on property deed, survey plats, etc.).

What is the Closure Performance Standard?

The closure performance standard is an analytical target, and is the goal of the clean up effort. Each hazardous constituent that is present in the affected media (soil, groundwater, etc.) has a closure performance standard. These levels may be based on naturally-occurring background levels, detection limits of the particular analytical method (MDL), drinking water standards, or health-risk based levels. These levels should be set before closure activities begin. If naturally-occurring background levels are used, a representative sample of the background conditions should be analyzed. A representative background sample may be comprised of more than one sample of each media. Multiple samples can help ensure that abnormalities are averaged out and natural variances are addressed.

The method detection limit (MDL) may be higher than the background level. In this case, the analytical method is not capable of detecting a constituent at the background levels. ADEQ would then use the MDL for the closure performance standard. If a drinking water standard has been set, that level may be used for the closure performance standard for groundwater.

Health based standards are standards that have been shown, on a site specific basis, to pose minimal or no threat to human health and the environment. Facilities proposing a health based standard must demonstrate that the proposed standard for each constituent will pose minimal or

no current or future threat to human health or the environment. Guidance on the content of proposals for health based standards, as well as the conservative exposure assumptions which must be utilized, may be found in the March 19, 1987 Federal Register (52 FR 8703-8709). Proposed standards may be based in part on published data (such as OSHA or NIOSH exposure limits), as well as health based clean up standards compiled by other States and/or EPA (such as those tabulated by EPA Region VI), or may be generated specifically for the facility in question. Regardless of the source of the data used, it must be demonstrated to be relevant and applicable to the facility in question (i.e., site specific applicability).

What types of sampling are required?

There are four types of sampling involved with clean closure: (1) background sampling, (2) initial sampling, (3) intermediate sampling, and (4) final confirmation sampling of all affected media.

Background Sampling

Background samples are taken to provide "naturally occurring" levels of any APC&EC Regulation No. 23, Section 264, Appendix IX constituents (Appendix IX constituents) that existed prior to the management of hazardous wastes on the site. The levels obtained by background sampling provide the baseline standard which clean-up and closure must meet before being certified clean closed. These samples should be taken in each medium affected at the site and in locations that are unaffected by hazardous waste management activities. If no background level of a particular constituent exists, then the clean closure performance standard is often set at the method detection limit (MDL) or at an alternate concentration level (ACL) for the parameter of concern.

Initial Sampling

Sampling for the constituents listed in Appendix IX must be addressed during closure. Appendix IX analyses are expensive; therefore, it is to the facilities' advantage to limit the number of full Appendix IX analyses where possible. This can be accomplished by obtaining representative samples of the wastes that were/are managed at the site prior to initiating closure activities and performing complete Appendix IX analysis on them. The final confirmation samples may then be analyzed for the constituents that are present in the wastes managed at the site. If sufficient information is supplied, the Appendix IX list may be shortened based on that rationale. For instance, if no pesticides were ever used or managed at the facility, then it is possible that the pesticides may be eliminated. However, it should be noted that ADEQ will approve the final list of analytes in the approved closure plan.

Intermediate Sampling

Intermediate sampling may be performed at various times prior to final confirmation sampling and samples may be analyzed for a "short list" of constituents. This "short list" could contain only those contaminants that appeared in the initial samples' Appendix IX analyses and/or an appropriate indicator parameter. Media removal and intermediate samples may be taken until the indicator parameter is no longer present above the closure performance standard.

The indicator parameter is usually chosen to be a constituent (or group of constituents) that is expected to migrate the farthest or be the most pervasive in the affected media. These samples are obtained for cost-effective and quick analysis to determine if an indicator parameter is present using field methods or in a mobile laboratory. Exploratory sampling allows for continued excavation if a dirty sample is found, or for the implementation of the confirmation sampling plan if all contamination is removed to the closure performance standard. Many facilities prefer this type of sampling and analysis because it allows the clean-up contractor to remove all necessary media while on-site without having to re-mobilize the crew if more soil or other media should require removal. This also reduces the number of Appendix IX analyses that must be performed.

The primary purpose of intermediate sampling is to provide a cost-effective means to monitor the progress of excavation and removal of wastes and media. It is included primarily for the benefit of the facility. Although the location, sampling method, and analyte list for intermediate samples does not require approval by ADEQ, the intermediate sampling plan should still be included in the closure plan for regulatory oversight even though it is not a specific regulatory requirement. This oversight may save the facility from choosing an inappropriate indicator parameter, or from overlooking areas of potential contamination.

Final Confirmation Sampling

After the intermediate samples test at or below the closure performance standard, a series of final confirmation samples should be obtained for complete Appendix IX (or limited Appendix IX, if appropriate) analysis to verify that the clean closure performance standard has been met. A final confirmation sample set is taken in an effort to confirm that all contamination has been removed from the site. The choice of sampling location and analytical parameters are more important for these final confirmation samples than for intermediate samples. Samples should be collected from all sides (three-dimensional) of excavated areas to document complete removal. The location, sampling method, and analysis (including chain of custody requirements) of these samples are closely scrutinized during ADEQ's review of the closure plan and closure certification. These sample results, as presented to ADEQ in the closure certification, provide the basis for either accepting or rejecting a facility's claim that all contamination has been removed.

Sometimes the confirmation sampling plan must be revised due to unexpected site conditions. For instance, contamination may be more extensive than initially thought. If exploratory sampling was unsuccessful in determining the extent of contamination, then the approved sampling plan may call for confirmation samples to be taken in areas that have been removed. Therefore, the confirmation sampling plan must be revised. In such an instance the facility should contact ADEQ with a proposal to amend the approved closure plan to include confirmation samples taken in the additionally excavated area.

Although each closure is different, (some require complete removal of various media, others require only cleaning and decontamination) final confirmation sampling is still required for a closure certification to be accepted by ADEQ.

How is sampling accomplished for various media?

Sampling of various media is accomplished through a multitude of accepted practices. Soil sampling is a fairly common closure requirement and expertise is common among contractors. However, this may not be true for the sampling of a tank or concrete, or other non-standard media. Non-standard methods should be thoroughly explained and justified (qualified) in the closure plan.

Non-Porous Surfaces

Sampling of non-porous surfaces, such as metal tanks, poses some inherent problems. For example, what method will allow for analysis of a tank surface to determine if volatile organic compounds (VOCs) have been removed? Obtaining a sample of the rinse solution is generally not accepted by ADEQ for use as decontamination verification due to dilution concerns. Use of solvent sampling to obtain a verification sample also carries with it the problem of dilution. If too much solvent is used, the presence of any VOCs could be hidden. Interference with analysis is also a problem. Use of a limited and measured amount of solvent after rinsing may be appropriate if proper restraints are used.

Another possibility is wipe sampling. In obtaining a wipe sample, a wiping cloth is saturated with a solvent and a known area is wiped with the cloth. Care must be taken when choosing a solvent for wipe samples. An analytical laboratory (preferably the lab that performs the analysis) should be contacted for advice in choosing solvents and wiping material. It should be noted that wipe samples are best suited for detecting the presence of a contaminant rather than determining

concentration. For tanks, the absence of a contaminant is adequate to determine if decontamination has been accomplished.

Porous Surfaces

For sampling porous surfaces such as concrete at least two options are available: (1) core sampling and (2) chip sampling. In a core sample, a concrete core is removed using a coring device. This core is then processed to provide a representative sample. Please note that the core should properly represent the concrete. If the sample is taken to provide information on the entire slab of concrete, then a full core should be taken. If the sample is meant to represent a certain layer(s) of the concrete, then a partial core may be taken. If a sample is needed to represent only the upper layer(s) of the slab, then a chip sample may be more manageable. A chip of the concrete is obtained by using a chipping hammer or other tool. The chip can then be processed for analysis.

Equipment

For equipment used in decontamination, ADEQ generally requires that visible contamination (such as mud or grease) be removed. The facility should decide if decontamination (and the resulting costs of disposal of wash waters and debris, etc.) is more economical than disposal as hazardous waste. It may be cheaper to dispose of contaminated shovels with the dirty personal protective equipment (such as used gloves and respirator cartridges) than to clean them and dispose or treat the wash water or other residues.

Decontamination Residues

Decontamination residues such as wash water or removed soil must be sampled and analyzed to ensure proper disposal. The residues must be determined to be hazardous or non-hazardous waste. If a facility decides not to analyze the waste, the wastes should be assumed to be hazardous wastes.

In summary, the purpose of waste analysis and sampling is to ensure and provide a written record that complete decontamination has been achieved. On the other hand, the sampling may serve to delineate the extent of any contamination that remains in place in the event of closure-in-place. This delineation is necessary **for** legal documentation purposes**.**

CLOSURE COST ESTIMATE, FINANCIAL ASSURANCE, AND SCHEDULE

An estimate of the cost to complete closure is required by APC&EC Regulation No. 23, Section 264.142 and Section 265.142 (interim status). This estimate must be based on the costs for hiring a third party to perform closure. The estimate must also be calculated for closure to occur at the time when it is expected to be most expensive (for example; closure in winter, media removal vs. capping etc.). The estimate must be based on the highest volume of waste ever stored at the facility. The estimate must include, but not be limited to, all costs for media removal, sample collection, sample analysis, labor, mobilization, backfill and disposal of debris and residues.

Financial assurance mechanisms are found in APC&EC Regulation No. 23, Section 264.143 and Section 265.143 (interim status). The financial assurance mechanism is a way to ensure that funds are available to perform closure. These funds would be available to ADEQ for performance of closure activities should the facility be abandoned and/or the owner fails to perform closure (Refer to Appendix A).

A schedule of closure activities which will occur during closure should be included in the plan. Since the exact date of closure plan approval is usually unknown, it is often best to base a closure schedule upon the date of approval of the closure plan. Since closure activities must be completed within 180 days of approval of the plan or closure of the facility, the schedule should show completion of all activities within 180 days unless otherwise specified by the ADEQ in the approved plan. The schedule may be in tabular form or may be included in the text of the plan, provided that all milestone events are included.

CERTIFICATION OF CLOSURE

Within 60 days after completing closure, the facility owner or operator must submit to the ADEQ, by registered mail, a final report demonstrating that the hazardous waste management unit or facility has been closed in accordance with the approved closure plan. This report should include all daily inspection summary reports, problem identification and corrective measure reports, inspection data sheets, photographic reporting data sheets, acceptance reports, deviations from design and materials specifications (with justifying documentation), and as-built drawings. The final report should also include manifests, decontamination, and sampling and analysis results if the approved closure plan specifies these actions. The closure activities must be documented by an independent registered (in Arkansas) professional engineer and included as part of the Certification of Closure documentation. Any additional documentation supporting the independent registered professional engineer's certification must be furnished to the ADEQ upon request, until the ADEQ releases the owner or operator from the financial requirements.

The final documentation should re-emphasize that areas of responsibility and lines of authority were clearly defined, understood, and accepted by all parties involved in the project. Signatures of the facility owner or operator, design engineer, quality control assurance officer, independent registered professional engineer, and construction contractor should be included as confirmation that each party understood and accepted the areas of responsibility and that they performed their function(s) in accordance with the approved closure plan. All signatures should be accompanied by the necessary statement from APC&EC Regulation No. 23, Section 270.11(b) and (d) which begins “I certify under penalty of law that this document....”.

Final documentation submitted to the ADEQ as part of the Certification of Closure does not sanction the certification as a guarantee of facility construction and performance. Rather, the primary purpose of the final documentation is to improve confidence in the closure through written evidence that the approved Closure Plan was implemented as approved and that the construction proceeded in accordance with design criteria, plans, and specifications.

In order for an independent registered professional engineer to give the required Certification of Closure they must have followed the closure process from beginning to end including several visits to the site during the closure. If the closure takes a long time to complete, the certifying engineer need not be on-site every single day. The engineer may use field personnel to verify some activities, but should be present for “milestone” activities. The certification should be based on the professional engineer's own observation and knowledge of the closure activities.

GLOSSARY

AFFECTED MEDIA: Groundwater, soil, surface water, air, etc. that have been impacted by management of hazardous waste.

ALTERNATE CONCENTRATION LEVEL (ACL): Level of contamination that has been deemed to pose no threat to human health and environment such that leaving the contamination in place is acceptable. An application for an ACL must be submitted to ADEQ for review. ADEQ will engage toxicologists and other technical staff to aid in the review of the ACL.

APPENDIX IX CONSTITUENTS: Constituents found in Appendix IX to APC&EC Regulation No. 23, Section 264, entitled "Groundwater Monitoring List". This list of chemicals may also be used for soil sampling.

BACKGROUND: Analytical levels of constituents that are naturally occurring. The background levels are the ideal closure performance standard.

CERTIFICATION OF CLOSURE: Statement and supporting documentation by a qualified independent registered professional engineer that a facility or unit has been closed according to the closure plan.

CHAIN OF CUSTODY: Steps taken to ensure that the integrity of samples is not compromised.

CLOSURE BY REMOVAL: Closure process in which all hazardous waste contamination is removed from a unit. The facility is released from financial responsibility for closure of the unit(s) and no post-closure requirements will be imposed. Also called "clean closure".

CLOSURE IN PLACE: Closure process in which all contamination cannot be removed. Post-closure requirements are imposed. The unit(s) must be closed as a hazardous waste landfill. Also called "dirty closure".

CLOSURE PERFORMANCE STANDARD: The analytical level of a constituent that is allowed to remain in a media.

CLOSURE PLAN: A plan which, when completed, results in a decontaminated (in the case of a clean closure) or a secured (in the case of dirty closure) site. In both cases, hazards to human health and the environment have been reduced as much as possible.

COLD ZONE: Uncontaminated area in which no personal protective equipment is needed.

CONSTITUENTS: Chemicals present in a waste. "Appendix IX" constituents are found in APC&EC Regulation No. 23, Section 264.

CORRECTIVE ACTION: Activities undertaken to decontaminate a facility or unit. It is particularly applicable to groundwater decontamination.

DECONTAMINATION: Removal of all hazardous waste constituents.

FINAL CLOSURE: Closure of all or the last unit at a facility. After final closure, no more regulated hazardous waste management units are in operation.

FINANCIAL ASSURANCE: Financial mechanisms, defined in APC&EC Regulation No. 23, Section 264.143 and Section 265.143 (interim status), used to ensure that funds exist to perform clean up of a facility, should the facility be abandoned.

GENERATOR: Any person, by individual generation site, whose act or process produces hazardous waste or whose act first causes a hazardous waste to become subject to regulation.

GROUNDWATER PROTECTION STANDARD: Analytical level of a constituent which has been determined to be protective of human health and the environment. The groundwater protection standard is the level of contaminants in groundwater which defines the point at which corrective action must begin.

HAZARDOUS WASTE MANAGEMENT UNIT: A contiguous area of land on or in which hazardous waste is placed, or the largest area in which there is significant likelihood of mixing hazardous waste constituents in the same area. Examples of hazardous waste management units include surface impoundments, waste piles, land treatment areas, landfill cells, tanks and associated ancillary piping and containment, incinerators, , and container storage areas. A container alone does not constitute a unit; the unit includes containers and the land or pad upon which they are placed.

HAZARDOUS WASTE: A waste that either exhibits a characteristic of a hazardous waste or a waste that is “listed”.

HOT ZONE: Contaminated area of a facility that requires use of personal protective equipment and decontamination of personnel and equipment before exit from the area.

HYDRAULICALLY INTERCONNECTED AQUIFERS: Water-bearing geologic formations that have been shown to be connected with the uppermost water-bearing zone through hydrogeologic investigation.

IN SITU: Latin phrase meaning “in place”. Wastes treated “in situ” are treated without removing them. For instance, in situ treatment of soils would be a method by which contamination of the soil was reduced without digging up the soil to place in a treatment unit.

INDEPENDENT REGISTERED PROFESSIONAL ENGINEER: A person which is not an employee of a company or organization which has a direct interest in the completion of the activity (e.g., the facility, construction contractor, etc.) which is to be certified and is registered as a professional engineer with the State of Arkansas Board of Registration for Professional Engineers and Land Surveyors and practicing under the Rules of Professional Conduct.

INTERIM STATUS: A facility is said to be in “interim status” when it is required to comply with APC&EC Regulation No. 23, Section 265.

METHOD DETECTION LIMIT (MDL): The lowest concentration of a chemical which can be detected by a particular analytical method. This level may vary depending on matrix interference. A sample “clean up” procedure may be available (in some cases) to lower the MDL. An analytical laboratory can provide more information on this topic.

NOTICE OF DEFICIENCY: Also called “NOD”. This is a list of comments prepared by ADEQ and sent to the facility. The comments are generated by reviewing a document such as a closure or post-closure plan. The comments raise questions, request more information, etc. in an effort to obtain a complete document.

OWNER/ OPERATOR: The person who owns in fee simple the property on which a facility or part of a facility is sited or the person responsible for the overall operation of the facility.

PART B POST-CLOSURE PERMIT APPLICATION: A site-specific document that is prepared and submitted to ADEQ to obtain a post-closure permit. This application is called a "Part B" to distinguish it from a "Part A" application, which is a fill-in-the-blank form for initial notification of hazardous waste activities.

PARTIAL CLOSURE: Closure of one or more units, but leaving one or more units in operation.

POINT OF COMPLIANCE (POC): Set of groundwater wells that define the point of the facility where the groundwater protection standard is applied.

PUBLIC NOTICE PERIOD: The period of time during which a closure plan that has been determined to be complete by ADEQ is placed in a location for the public to review. The public and the facility may review the closure plan and make comments to ADEQ concerning that closure plan

PUBLICLY OWNED TREATMENT WORKS (POTW): Any device or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature which is owned by the State or municipality

QA/QC: Quality Assurance/Quality Control. QA/QC consists of the steps that samplers and analytical laboratories take to ensure the quality of the data developed from site sampling and analysis. The QA/QC includes chain of custody documentation as well as the internal procedures the laboratory follows to ensure reproducibility of the analytical data.

SAMPLING PLAN: A plan that includes, but is not limited to: all instructions for choosing media to be sampled, location of samples, and sample preservation techniques.

SW-846: EPA Document entitled "Test Methods for Evaluating Solid Wastes/ Chemical/Physical Methods". EPA's document number is "SW-846".

TRANSITION ZONE: Area between the hot zone and the cold zone where decontamination procedures take place.

TSD FACILITY (or TSD): A facility that treats, stores, or disposes of hazardous waste. The terms "treatment", "storage", and "disposal" are defined in APC&EC Regulation No. 23, Section 260.10.

UPPERMOST AQUIFER: The geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary.

VOLATILE ORGANIC COMPOUNDS (VOCS): Organic compounds having a boiling point below 200°C. These compounds are listed in Method 8240 of EPA SW-846.

WASTE ANALYSIS PLAN: Also called a "WAP". This plan includes all analytical parameters. The types of media to be analyzed, the locations (or criteria for choosing parameters), the analytical methods to be employed, and constituents for analysis are included, among other things.

WASTE CODE: A code, defined by EPA and States, that classifies hazardous wastes. The waste codes are listed in APC&EC Regulation No. 23, Section 261.1 through 261.38.

APPENDIX A
FINANCIAL ASSURANCE

FINANCIAL ASSURANCE

What is RCRA financial assurance and who needs it?

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure and post-closure care of their facilities. They also must demonstrate that they have sufficient funds to pay for the clean up of any accidental releases of hazardous constituents during the active life of their facilities, and compensate any third parties for any resulting bodily injury or property damage.

The regulations for these demonstrations, referred to as "financial assurance," are found in the Regulation No. 23, Sections 264 and 265, Subsections H (Financial Requirements). Section 264 applies to permitted facilities and Section 265 applies to interim status facilities as well as any other party who may be required to carry out a cleanup under an enforcement order, and provide financial assurances for such cleanup). These regulations outline how hazardous waste treatement, storage, and disposal facility (TSD, or TSDF) owners and operators should determine cost estimates, the acceptable mechanisms for demonstrating financial assurance, and the minimum amounts of liability coverage required.

The closure and post-closure requirements set forth in Regulation No. 23 are designed to protect human health and the environment from the long-term threats associated with hazardous waste management and permanent disposal. Many of these detailed requirements apply at the end of a facility's waste management operations and can be very expensive.

To prevent a facility from ceasing operations and failing to provide for the potentially costly closure and post-closure care requirements, EPA and ADEQ have promulgated regulations requiring TSDFs to demonstrate that they have the financial resources to properly conduct closure and post-closure in a manner that protects human health and the environment.

The TSDF general facility standards include precautions to prepare a facility for accidents, spills, and any resulting emergency responses. Such unexpected events could damage third parties by impacting human health or property outside the facility. In order to compensate third parties for injury or damage that might result from such events (known as **liabilities**), the RCRA regulations require TSDF owners and operators to prove that they have the financial resources to pay for bodily injury or property damage that might result from waste management. The closure, post-closure, and liability financial resource requirements are called **financial assurance**.

In addition to requiring facilities to set aside funds for closure, post-closure, and liabilities, the RCRA regulations specify the financial mechanisms that TSDF owners and operators must use to ensure that the financial resources are available in the event that they are needed.

Financial Assurance for Closure / Post-Closure Care

After a TSDF owner and operator prepares the required written closure and post-closure plans for their facility, they must prepare a cost estimate that reflects how much it would cost to hire a third-party contractor to close the facility. These estimates provide the base figure for the amount of financial assurance a facility must provide.

Cost Estimates

Cost estimates must reflect the cost of hiring a third party to conduct all activities outlined in the closure and post-closure plans. Closure cost estimates are based on the point in the facility's operating life when closure would be the most expensive. Post-closure cost estimates are based on projected costs for an entire post-closure period of 30 years, unless this time period is reduced or extended by ADEQ.

Any facility which is required to prepare a closure plan or a post-closure plan must also prepare a cost estimate that covers how much it will cost to carry out the plans. These cost estimates must:

- Be based on the specific activities described in the closure and post-closure plans (e.g., inventory disposal, facility decontamination, etc.)
- Account for all tasks and sub-tasks included in each planned activity (e.g., disposal costs, transportation and disposal of wastes offsite, solvents for decontaminations, etc.)
- Account for all cost components (utilities, administration, profits, etc.)
- Include all direct costs (materials, labor, equipment)
- Include all indirect costs (supervision & oversight fees, contractor fees, contingency fees, etc.)

Cost estimates for closure and post-closure care must be based upon the most likely maximum cost conditions (e.g., the facility's full capacity must be disposed; all contaminated soils must be excavated, etc.). Likewise, the estimate must address fully loaded costs, e.g. if a set of contractor estimates is used to derive the projected costs, then the most expensive estimate is the one that must be used. The facility operators do not, however, need to include unexpected contingencies such as a 100-year flood, tornado, or other catastrophic event. However, the closure and post-closure plans and their associated cost estimates must account for the likelihood of any circumstances which are likely to occur during closure and the following 30-year post-closure period. If the facility or its capacity is expanded over time, then the cost estimates must be updated accordingly.

The cost estimate must be based on hiring an independent, third-party contractor to carry out all closure and post-closure activities. "Third party" means a party or company that is not a parent, sister, or subsidiary of the owner/operator. The estimate may provide for using the facility's equipment or on-site disposal capacity, provided that this capacity is demonstrated in the appropriate plan, but costs must be based on using third-party operators. No salvage value is allowed for the sale of any facility wastes or equipment. This does not bar the owner/operator or third party cleanup contractor from selling equipment or recycling wastes during closure, but credit for these values cannot be reflected in the cost estimates.

Cost estimates must be updated when changes in the closure or post-closure plans would increase operational costs; when the facility adds additional capacity or waste management units, or at least annually to account for inflation. The annual update for inflation must be completed within 60 days prior to the anniversary date for the financial instrument used to provide assurance for the costs. Updates for any other changes must be completed within 30 days after approval of the modification to the closure or post-closure plan. Such a revision must also include any needed adjustment for inflation.

Updates for inflation may be accomplished by either recalculating the cost estimate

using current dollars, or by multiplying the previous year's cost estimate by an "inflation factor" provided by ADEQ. In either case, the corresponding financial assurance mechanism must be updated as well in order to cover the updated costs.

Period of Coverage
TSDF owners and operators must maintain financial assurance until closure and post-closure are complete. Within 60 days after receiving the owner or operator's and an independent registered professional engineer's certification of final closure, ADEQ will notify the owner and operator that financial assurance for final closure is no longer required. Similarly, within 60 days after receiving these certifications of completion of post-closure care, ADEQ will notify the owner and operator that financial assurance for post-closure is no longer required.

Accident Liability Requirements
TSDF owners and operators must also be able to compensate third parties for bodily injury or property damage that might result from hazardous waste management at a facility. This coverage ensures that, in the event of an accidental release of hazardous constituents, money will be available to compensate affected third parties (facility neighbors, etc.) suffering bodily injury or property damage. All active TSDFs must demonstrate liability coverage for sudden accidents. In addition, TSDFs with land-based units (e.g., landfills, or units closed with wastes left in place) must also demonstrate liability coverage for nonsudden accidents.

Sudden Accidental Occurrences
The inherent risks posed by hazardous waste management at all TSDFs bring the possibility of sudden accidents. These **sudden accidental occurrences** are defined as events that are not continuous or repeated. Examples of sudden accidental occurrences are fires and explosions. The minimum financial requirements include at least $1 million per occurrence, and an annual total (known as annual aggregate) of at least $2 million.

Nonsudden Accidental Occurrences
Because land-based units are located directly on the land, they bring an increased risk of slow, long term nonsudden leaks or other releases to soil and ground water, and exposure to human health and the environment. These **nonsudden accidental occurrences** are defined as events that take place over time and involve continuous or repeated exposure to hazardous waste. An example of a nonsudden accidental occurrence is a leaking surface impoundment that contaminates a drinking water source over time. The minimum financial requirements include at least $3 million per occurrence, and an annual aggregate of at least $6 million.

These liability financial assurance coverage amounts apply on an owner and operator basis, not on a per facility basis. Consequently, owners and operators must provide $1 million per occurrence and $2 million annual aggregate for sudden accidental occurrences, and $3 million per occurrence and $6 million annual aggregate for nonsudden accidental occurrences (if applicable), regardless of the number of facilities owned and operated.

Period of Coverage
TSDF owners and operators must maintain financial liability coverage until closure is complete. Within 60 days after receiving a TSDF's certification of final closure, ADEQ will notify the owner and operator that liability financial assurance is no longer required. Liability coverage is not required during the post-closure period. ADEQ

may, however, require continued liability coverage if closure was not completed in accordance with the facility's closure plan.

Financial Assurance Mechanisms

Financial assurance mechanisms are the different ways an owner or operator can show that funds are available to pay for closure, post-closure, and liability requirements. An owner/operator may demonstrate financial assurance through one or more of the following financial assurance mechanisms:

- Trust fund
- Surety bond (two types)
  - Payment bond
  - Performance bond
- Letter of credit
- Insurance
- Financial test
- Corporate guarantee.

Trust Funds

A **trust fund** is an agreement between three parties. One party (the Grantor) transfers assets to a trust that a second party (the Trustee), holds and administers for the benefit of a third party (the Beneficiary). For the purposes of financial assurance, the owner/operator of a RCRA-permitted facility is the Grantor. ADEQ is the Beneficiary.

The funds are held in trust for the purpose of paying expenses related to closure, post-closure, corrective actions, and/or liability obligations of the permitted facility. Essentially, the owner/operator deposits funds into the Trust to cover his current cost estimates. This mechanism allows a facility to set aside money in increments, according to a phased-in schedule (known as a pay-in period). At the end of this pay-in period, the facility will have enough money set aside to cover its financial assurance costs and will have funds specifically earmarked for these requirements. For new permittees, the pay-in period is typically the first term of the permit (10 years).

In addition to deposits into the trust, the owner/operator typically pays a fee for the administrative services performed by the Trustee. These fees will vary depending on the financial institution. Although the Trustee is empowered to invest the funds held in trust, the types of investments are limited by the RCRA regulations. Investment income (interest, etc.) accrues to the trust fund. At ADEQ's discretion, this income may reduce the required payments by the owner/ operator.

If the owner/operator fails to perform closure or post-closure, then ADEQ may obtain a remediation contractor and direct the Trustee to release funds from the trust to pay for the needed activities.

If an owner or operator changes his mechanism to a trust fund from a different instrument, the initial payment into the fund must be the same as if he had been paying into the fund from the initial date of the permit; after that time he may use the payment schedule. If, for whatever reason, the owner/operator establishes a trust fund for financial assurance after the initial ten years of the permit, then there is no pay-in period; the trust fund must be fully-funded from the start.

Under some of the other financial assurance mechanisms (surety bonds and letters

of credit), the owner/operator must also establish and submit to ADEQ a **standby trust agreement**. This is a contingency trust into which any payments made by the bond or letter of credit will be deposited should the instruments need to be cashed in. ADEQ will then use this trust fund to cover the respective costs of closure and post closure.

Letters of Credit

A **letter of credit** is a document issued by a financial institution (e.g, a bank) that guarantees the payment of a customer's obligations up to a stated amount for a specified period of time. For the purpose of financial assurance, the facility owner/operator arranges with a bank to issue a letter of credit. The letter of credit provides ADEQ with assurance that the owner/operator will pay the costs of closure, post-closure, corrective actions, or liability activities when necessary. Essentially, a letter of credit substitutes the bank's credit for that of the owner/operator, eliminating much of the risk that public funds will be needed to carry out closure and post-closure. The letter of credit must cover the current cost estimate(s); issued for at least one year; irrevocable; and "evergreen," e.g., automatically renewable). The financial institution issuing the letter of credit must be regulated and regularly examined by a State or Federal agency.

To secure a letter of credit, the owner/operator will have to pay the financial institution a fee equal to the percentage of the face value of the letter of credit. The amount of this fee will depend on the owner/operator's credit worthiness or financial solvency. The financial institution may also require the owner/ operator to set aside cash or non-cash collateral to secure the letter of credit.

If ADEQ determines that the owner/operator has failed to perform closure and/or post-closure as required, or will be financially unable to do so, then ADEQ will direct the bank to deposit cash (up to the limits of the letter of credit) into a standby trust fund. ADEQ will then secure a remediation contractor and direct payment of requisite moneys from the standby trust to pay for closure, post-closure, and other required activities. The owner/operator is legally obligated to repay the bank for any principal amounts drawn from the letter of credit, plus interest.

A facility submitting a letter of credit as its financial assurance mechanism must also provide a signed, original copy of a standby trust agreement.

Surety Bonds

A **surety bond** is a contract between two parties. One party (the Surety) guarantees that the obligations of the second party (the Principal) will be met. For the purposes of financial assurance, the owner/operator of the RCRA-permitted facility is the Principal. Through a surety bond, the Surety guarantees to ADEQ that it will meet the owner/operator's closure, post-closure, corrective action, and/or liability obligations, up to the limit of the bond, if the owner/operator is unable to do so. Similar to a bank with letter of credit, the Surety provides the owner/operator with financial backing. In return for the Surety's guarantee, the owner/operator pays and annual premium based on the face value of the bond. Depending on the degree of risk that the owner/operator may default on their obligations, the Surety may require cash collateral and/or accelerated premium payments to ensure that the bond is fully funded.

There are two types of surety bonds:

• **Payment bond** — A payment bond will, in the event an owner/operator fail to fulfill their financial assurance closure and post-closure obligations, pay out the face value of the bond into a standby trust fund. in the amount equal to the face value of the bond. Payment bonds can also be used for liability.

• **Performance bond** — A performance bond guarantees that the owner and operator will comply with their closure and post-closure requirements, typically by the surety hiring a contractor and carrying out the closure and post closure activities on behalf of the owner/operator, or that it will pay out the face value of the bond into a standby trust fund. Facilities which do not have a final RCRA permit may not use performance bonds, and performance bonds may not be used in combination with any other financial assurance mechanism.

With either type of surety bond, the Surety retains the right to pursue reimbursement from the owner/operator for any funds paid on his behalf.

A facility submitting a surety bond as its financial assurance mechanism must also provide a standby trust agreement.

Insurance

The owner or operator of a TSDF may take out an **insurance** policy to cover the cost of closure, post-closure, and liability requirements in the event that the owner/operator is unable to satisfy these obligations.

An insurance policy is a contract between two parties. One party (the Insurer) agrees to pay, on behalf of the second party (the Policyholder) for claims made against the policyholder or the policy. For the purposes of financial assurance, the facility owner/operator is the Policy holder.

Through a policy, the Insurer agrees to reimburse the Policyholder or another party, upon direction from ADEQ, for costs incurred for closure or post-closure care, corrective actions, or liability obligations. In return, the Insurer requires that the Policyholder pay: 1) a percentage of the policy limit up front, as a form of cash collateral, and 2) periodic cash payments (“premiums”). The cash collateral requirements and premium payments are usually based on the likelihood of: 1) the loss occurring; and 2) the Insurer having to pay claims up to the policy limit. Unlike other mechanisms, the Insurer reimburses ADEQ and other parties directly, no standby trust is required.

Unlike your home or automobile insurance policies, most Insurers underwriting policies for RCRA financial assurance will do so using only finite, or fully-funded policies. These finite policies tend to more closely resemble trust funds than conventional general liability policies, limiting the liability and risk exposure of the Insurer. In these cases, the owner/operator must pay the Insurer an up-front premium equal to the net present value of the future expected amount of the closure, post closure, and corrective action costs. Depending on the situation, the owner/operator may allow the owner/operator to pay in phases.

The face amount of the policy must at least equal to the total of the facility’s current cost estimate(s).

The insurance policy itself must:

- Stipulate that the Insurer may not cancel, terminate, or fail to renew the policy except if the owner/operator fails to pay the premium;
- Be automatically renewable (or "evergreen") at no less than the face amount of the expiring policy;
- Contain a provision that allows the policy to be assigned or transferred to the owner/operator's successor in operation of the covered facility;
- Ensure that even if closure has been ordered, the policy cannot be cancelled;
- Contain no deductibles or self-insured retentions, e.g., the policy must pay from the first dollar of any claim. Many policies issued after 2001 contain an exclusion of coverage for terrorist acts; this is not allowable in a financial assurance policy. Even if closure is the result of a terrorist act, the policy must pay.

Facilities using an insurance policy for their financial assurance must provide ADEQ with an originally signed certificate of insurance as well as an original copy of the insurance policy with all attachments and endorsements. The insurance company must be registered and approved by the Arkansas Insurance Department, and favorably rated by a national insurance rating firm. Captive insurance, e.g., an insurer which issues policies only for units of its parent company, may not be used to demonstrate financial assurance under Regulation No. 23.

Corporate Financial Test

Some companies are of such size and financial strength that they have the assets to absorb the costs of closure, post-closure, and liability obligations. As a result, owners and operators can demonstrate and document their financial strength by using the **financial test** to satisfy the TSDF financial assurance requirements.

Facilities using the financial test as their financial assurance mechanism are not required to post a cash instrument, but are still required to provide a substantial amount of information to prove their fiscal strength and viability, to include independently audited copies of their most recent annual financial statements. Should the facility no longer meet the requirements of the financial test at any time, ADEQ may require the facility to provide an alternative mechanism for financial assurance.

The corporate financial test may not be used in combination with any other financial assurance mechanism; the test must address the total sum of the company's assets, liabilities, and cost estimates. Companies with limited operational experience under their current organizational structure, e.g., with less than one completed fiscal year of independent operations as documented by an independent audit of their annual financial statements, may not use the corporate financial test as a financial assurance mechanism.

Corporate Guarantee

While not all companies will be able to meet the corporate financial test requirements, they may be owned by a company (or have a sibling company) that has the financial standing and ability to meet the financial test requirements. In these cases, a TSDF owner and operator may arrange a **corporate guarantee** by demonstrating and documenting that its corporate parent, corporate grandparent,

sibling corporation, or a firm with a substantial business relationship with the owner or operator (the Guarantor) meets the financial test requirements on its behalf. In this case, the Guarantor "stands in the shoes" of the permitted owner or operator with regard to responsibility for all costs of closure, post-closure, corrective actions, and liability.

Specific requirements for each mechanism are contained in Regulation No. 23 Section 264, Subsection H. Model language for each financial instrument is listed at Section 264.151.

When does an owner or operator of a permitted facility who uses the financial test or corporate guarantee to fulfill RCRA financial assurance requirements need to update and submit a closure cost estimate to ADEQ?
The closure cost estimate must be updated for inflation within 30 days of the close of the facility's fiscal year and it must be placed in the updated financial records that are kept at the facility (Reg. No. 23 § 264.142(d)). Owners or operators who use the financial test or corporate guarantee have 90 days after the close of the fiscal year to submit all updated information, including the updated cost estimate, to the implementing agency (§ 264.143(f)(5)).

When is the owner or operator of a TSDF released from the requirement to demonstrate financial assurance for both closure/post-closure costs and liability coverage?
Within 60 days after receiving the final closure certifications from the owner or operator and an independent professional engineer, ADEQ will notify the owner or operator in writing that he is no longer required to maintain financial assurance at the facility (Reg. No. 23 §§ 264.143(i) and 264.147(e)).

What if I want to change the type of financial instrument that my facility is using?
Facilities wishing to change from one financial mechanism to another must notify ADEQ in writing, and provide the compliant, alternative mechanism to ADEQ. Once ADEQ has reviewed and accepted the new mechanism, the old, replaced mechanism will be released and returned to the facility owner/operator or issuing financial institution, as may be appropriate.

What happens if my financial assurance instrument is cancelled?
In the case that a financial institution decides not to renew, or to cancel a financial assurance instrument, it must provide both the facility owner/operator and ADEQ with written notice no less than 120 calendar days in advance of the effective date of cancellation.

ADEQ will then notify the facility owner/operator and the financial institution that it has received the notice of cancellation, and direct to owner/operator to provide an alternative, compliant financial assurance mechanism within 60 calendar days.

If, within calendar 90 days of the notice, the responsible owner/operator has not

provided a compliant replacement instrument, ADEQ will then draw on a cash instrument and direct the issuing financial institution to pay the face value of the instrument into the standby trust fund, and will use those funds to carry out the necessary closure, post-closure, and/or corrective actions at the facility.

Facilities which use the Corporate Financial Test, or Corporate Guarantee, and find that they no longer meet the requirements of that test, must notify ADEQ in writing, and provide a compliant, alternative financial assurance mechanism within 60 calendar days.

If ownership or operational control of a TSDF changes, how long does the new owner/operator have to comply with the financial assurance requirements?

New owners and operators of treatment, storage and disposal facilities (TSDFs) must demonstrate compliant financial assurance no later than the date of transfer of operational control for the facility. (Reg. No. 23, § 270.40(b)) Note: This Arkansas requirement is significantly more stringent than the equivalent federal regulation.)

The old owner or operator must continue to comply with the financial assurance requirements until the new owner or operator has demonstrated compliance with those same requirements. When the new owner or operator has demonstrated such compliance to the ADEQ Director, then the Director will notify old owner or operator that he or she no longer needs to comply with the financial assurance regulations as of the date demonstrated. (§ 270.40(b) for permitted facilities and § 270.72(a)(4) for interim status facilities.)

Can an owner or operator of a treatment, storage, or disposal facility (TSDF) use the same mechanism to comply with both closure and post-closure care, as well as corrective action financial assurance requirements in Regulation No. 23 § 264, Subsection H?

Yes. An owner or operator of an TSDF may satisfy the requirements for financial assurance for both closure and post-closure care by using a trust fund, surety bond, letter of credit, or insurance that meets the specifications for the mechanism in Sections 264.143 and 264.145. The amount of funds available through the mechanism must be no less than the sum of funds that would be available if a separate mechanism had been established and maintained for financial assurance of closure and post-closure care (Section 264.146).

Please note that performance bonds, the corporate financial test, and the corporate guarantee may not be used in combination with any other mechanisms