



ARKANSAS  
Department of Environmental Quality

August 5, 2015

Mr. David Hopkins, Office Manager  
Terracon Consultants, Inc.  
25809 I-30 South  
Bryant, Arkansas 72022

**RE: Draft Scope of Work - Feasibility Study – Investigation and Cost of Options  
Professional Services Contract #ADEQ005999  
Solid Waste Landfill Post-Closure Trust Fund  
DAMCO Inc. – Waste Tire Processing Facility Permit  
Adjacent Tire Dam – Alternative End Use Project  
Permit Number: 0022-SWTP; AFIN: 03-00208  
Document Number: 67946**

Dear Mr. Hopkins:

The Arkansas Department of Environmental Quality (ADEQ) currently holds a professional services contract (Contract #ADEQ005999) with Terracon Consultants, Inc. for the execution of environmental assessments, and corrective action design and construction oversight related to closed landfills and tire processing facilities and disposal sites within the State of Arkansas. The ADEQ - Solid Waste Management Division (ADEQ-SWMD) has identified the facilities referenced above for corrective action feasibility study work. The site is located at 831 CR 784, Mountain Home, AR 72623, Section 33, Township 21 North Range 13 West, Baxter County, Arkansas. The facility previously operated a permitted waste tire processing operation which included primarily baling whole tires in preparation for use of the bales within the adjacent tire dam alternate end use project. Other associated activities have occurred over the years of operation including the acceptance of whole truck tire or oversized or implement tires which may also be stored on-site. Recent reports indicate the tire processing facility currently has stored roughly 10,000 bales of whole tires and an undetermined amount of loose and oversized tires. These tires and remaining equipment must be re-used or disposed properly to achieve proper and environmentally sound closure of the permitted facility. From visual inspection it appears the adjacent tire dam was possibly constructed according to the original drawings then additional downstream extensions were added to the original dam configured in successive downstream benches and a final downstream face placed at roughly 2:1 (horizontal: vertical) slope. Much of the current tire dam lacks soil cover with tire bales exposed, vegetated and unfinished according to the plans for cover. The existing site conditions are such that corrective actions are necessary at the site and funding for correcting each of these areas is now available through the Post Closure Trust Fund (PCTF) after recent statutory revisions.

As indicated from Department inspection reports, the facility is not closed properly and presents various threats in the current condition such as vector attractants in the form of insect breeding or animal burrowing, stability concerns, and substantial fire hazards. Due to the complexity of the cost of clean-up options, it has been determined that some corrective action feasibility evaluation should be

accomplished. A feasibility study is needed to identify the different potential corrective action remedies for the site and analyze, in part, the effectiveness, implementability, and relative cost associated with each remedy. The feasibility study will help determine the best overall remedial approach to all of the current site conditions.

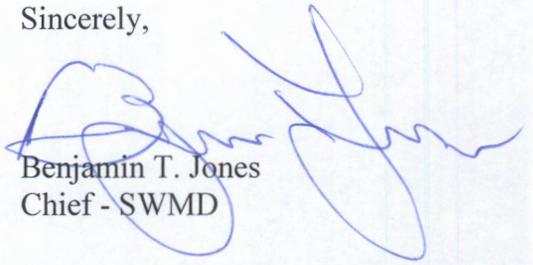
As outlined in Attachment #4 of Contract #ADEQ005999, ADEQ has developed a site specific Draft Scope of Work (DSOW), included herein, and hereby issues this DSOW to the professional services consultant. In accordance with the Contract, the consultant will refine and detail the DSOW with project estimated costs and specific task items similar to those applicable corrective action tasks listed in the Request for Qualification (RFQ) issued in April 2010 as part of the contract solicitation, and similar to the draft corrective measures study scope of work presented in the 1994 RCRA Corrective Action Plan referenced later in this letter. The refined DSOW will be submitted as the Scope of Work (SOW), and will be reviewed by ADEQ-SWMD. After an agreement is reached on the SOW (including the estimated cost of the feasibility work), the consultant shall draft a site specific Feasibility Study Work Plan including task details of the feasibility work and a work schedule.

#### Draft Scope of Work (DSOW)

Feasibility Study of Corrective Action Remedy: The professional service consultant is tasked to perform a feasibility study (FS) of alternate closure, clean-up and corrective action options related to the environmental conditions at the DAMCO site. The FS work shall identify alternative corrective actions to abate the negative environmental impacts and evaluate those alternatives to determine the best approach to remedy the environmental conditions at the site. The study shall provide cost estimates of alternatives with to be used by the Department in evaluating the next steps of design and planning the clean-up and closure of the tire processing facility and adjacent tire bale dam. As indicated in the RFP (April 2010), the feasibility work should follow applicable portions of the referenced USEPA "Region 6 Corrective Action Design Strategy - Guide for Pilot Projects", November 2000. Since the RFP solicitation that guidance has been superseded by USEPA document entitled, "Region 6 - Corrective Action Strategy (CAS)", November 2008. This document can be accessed on the USEPA, Region 6 webpage under RCRA Corrective Action. A useful fact sheet entitled, "Final Remedy Selection for Results Based RCRA Corrective Action", USEPA, March 2000 provides an overview of the CAS remedy selection process as it relates to the feasibility work. This fact sheet is enclosed herein. Also, the USEPA document entitled "RCRA Corrective Action Plan", USEPA, May 1994 (OSWER Directive 9902.3-2A) provides details of conducting feasibility studies, also known as corrective measures studies. This document, which provides a comprehensive step-by-step outline for performing corrective measures studies, can be accessed on the main USEPA webpage and searching for RCRA Corrective Action Plan 1994. In addition to the applicable federal standards and criteria to be reviewed during the remedy/corrective action selection, Arkansas' promulgated regulations (e.g., Reg. 2, Reg. 14, Reg. 22, etc...) shall be applicable. Arkansas also has the "Ground Water Remediation Level Interim Policy and Technical Guidance", attached herein, that is applicable to the Post Closure Trust Fund work. Discrepancies among the above referenced guidance and regulations will be resolved and clarified in the Post Closure Feasibility Study Work Plan

If you have any questions regarding this correspondence please contact Clark McWilliams at (501) 682-0510.

Sincerely,



Benjamin T. Jones  
Chief - SWMD

Enclosures: Final Remedy Selection for Results Based RCRA Corrective Action - Fact Sheet #3  
Ground Water Remediation Level Interim Policy and Technical Guidance

cc: Clark McWilliams P.E., Engineer, SWMD  
Barbara Nierstheimer, Fiscal Division  
Keith Reed, Chief, Fiscal Division  
Bill Sadler, Geologist Supervisor, SWMD  
Flora Wrather, Administrative Analyst, SWMD  
Quinn Baber, Terracon Consultants, Inc.

## FACT SHEET #3

# FINAL REMEDY SELECTION FOR RESULTS-BASED RCRA CORRECTIVE ACTION



*Congress, the general public, EPA, and State agencies believe the rate and pace of RCRA cleanups should be increased. Tim Fields, Assistant Administrator of the Office of Solid Waste and Emergency Response, recently indicated that Corrective Action was the RCRA program's highest priority. One of the efforts designed to improve Corrective Action progress is a new workshop titled "RCRA Corrective Action Workshop on Results-Based Project Management". This fact sheet, the third in the series supporting the Workshop, is intended to improve the pace of remedy evaluation and selection by clarifying EPA's guidance and highlighting areas of administrative flexibility. Notes and references are provided at the end of the fact sheet.*

### How can this fact sheet <sup>(1)</sup> help you?

If you are involved with RCRA Corrective Action as an EPA or State regulator, member of the public, or representative of a facility, this fact sheet can help you understand:

- the difference between an "interim" and "final" remedy;
- the three performance standards that EPA believes all final remedies should achieve;
- how to identify the "best" remedy when one or more alternatives appear to be capable of achieving the three performance standards;
- EPA's expectations for how thorough the evaluation of remedial alternatives needs to be; and,
- the roles and responsibilities in evaluating and selecting a final remedy.

### What are the primary differences between a final and interim remedy?

#### Interim Remedies

- Interim measures should control, minimize or eliminate threats to human health and the environment (HH&E) in the short term until the owner/operator has implemented a final remedy.
- Interim measures can often be implemented quickly.
- Meeting all requirements for the interim measure does not mean a facility has completed all of their corrective action obligations.
- Interim measures should also, to the extent practicable, be consistent with anticipated final remedies.

#### Final Remedies

- Final remedies should provide long-term protection of HH&E by achieving three performance standards (described on next page).
- Final remedies typically go through a more rigorous evaluation than interim remedies.
- Completing a final remedy, including long-term monitoring as appropriate, means that the facility is done with corrective action for the part of the facility addressed by the final remedy.

Stakeholders should keep in mind that, currently, the two most important short-term goals of the RCRA Corrective Action program are to achieve two “environmental indicators.” These two indicators focus on ensuring that humans are not exposed to unacceptable levels of contamination, and that contaminated groundwater does not continue to migrate above levels of concern beyond its current furthest three-dimensional extent. As warranted, facilities should implement interim measures where necessary to achieve these indicators as soon as possible. For more information on environmental indicators, refer to <http://www.epa.gov/epaoswer/osw/cleanup.htm#indicators>.

## What should final RCRA Corrective Action remedies accomplish?

EPA believes that final remedies selected for RCRA Corrective Action facilities should achieve the following **three performance standards**:

1. **Protect human health and the environment based on reasonably anticipated land use(s), both now and in the future.**

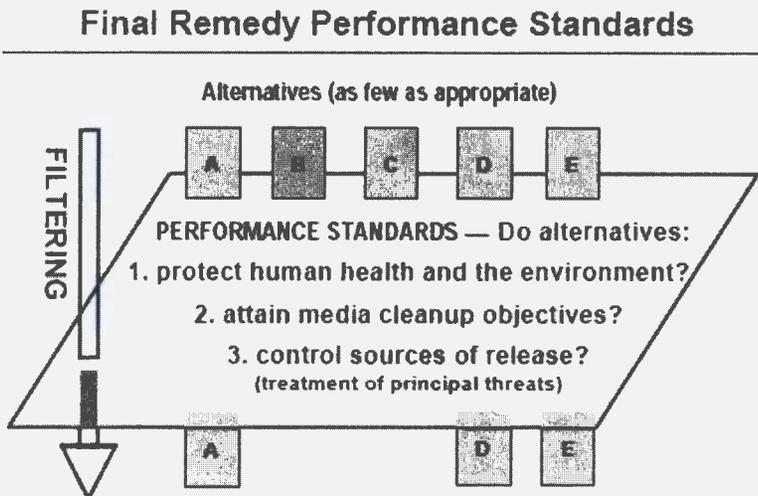
Protecting human health and the environment is the general mandate from the RCRA statute; therefore, it is appropriate to include this goal as the first performance standard for final RCRA Corrective Action remedies. This standard also serves to ensure remedies include protective activities (e.g., providing an alternative drinking water supply) that would not necessarily be needed to achieve the other two standards.

2. **Achieve media cleanup objectives appropriate to the assumptions regarding current and reasonably anticipated land use(s) and current and potential beneficial uses of water resources. The cleanup objectives should address media cleanup levels (chemical concentrations), points of compliance (where cleanup levels should be achieved), and remediation time frames (time to implement the remedy and achieve cleanup levels at the point of compliance).**

Note that for human health, EPA’s goal remains to reduce the threat from carcinogenic contaminants such that, for any medium, the excess risk of cancer to an individual exposed over a lifetime generally falls within a range from one in ten thousand to one in one million (i.e.,  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ ). Note also that EPA prefers cleanup levels at the more protective end of this risk range; however, cleanup levels determined on a site-specific basis that represent anywhere within the range could be acceptable. For toxicants associated with adverse effects other than cancer, groundwater cleanup levels should be established at concentrations to which human populations, including sensitive subgroups, could be exposed on a daily basis without appreciable risk of negative effect during a lifetime. Such levels are generally interpreted as equal to or below a Hazard Index of one.

3. **Remediate the sources of releases so as to eliminate or reduce further releases of hazardous wastes or hazardous constituents that may pose a threat to human health and the environment, and using treatment to address principal threat wastes<sup>2</sup>, unless alternative approaches are approved by the overseeing regulator. In this context, “sources” includes both the location of the original release as well as locations where significant mass of contaminants may have migrated. Note that while EPA expects facilities to use treatment technologies to address principal threats, we also expect that containment technologies as well as institutional controls can be used to address wastes that pose relatively low long-term threats.**

You could think of the final remedy performance standards as a threshold that needs to be crossed or a filter or screen (Figure 1) that needs to be passed through prior to considering an option further. For example, remedial alternatives B and C, as shown in the adjacent graphic, do not need to be considered further because it was obvious to decision-makers that they were not capable of achieving the three final remedy performance standards.



### What other tools should I use to determine the best remedy for a particular situation?

When one or more alternatives appear to be capable of achieving the three final remedy performance standards (e.g., Alternatives A, D and E in the above graphic), EPA recommends that decision-makers use the seven attributes (called **Balancing/Evaluation Criteria**) listed below to help identify the "best" option.

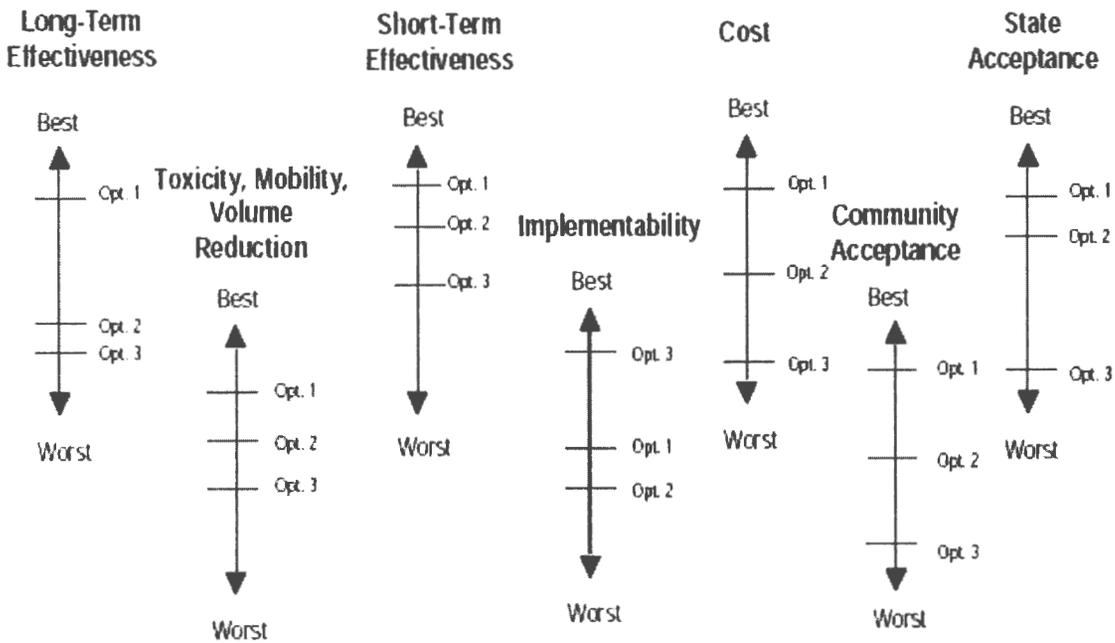
1. **Long-Term Effectiveness:** Decision-makers should evaluate remedies based on the long-term reliability and effectiveness they afford, along with the degree of certainty that they will remain protective of human health and the environment. Additional considerations include: the magnitude of risks that will remain at a site from untreated hazardous wastes, and hazardous wastes and hazardous constituents, and treatment residuals; and the reliability of any containment systems and institutional controls. A remedial option should include a description of the approaches facilities will be used to assess long-term performance and effectiveness.
2. **Toxicity, Mobility, and Volume Reduction:** Decision-makers should evaluate remedies based on the degree to which they employ treatment, including treatment of principal threats, that reduces the toxicity, mobility or volume of hazardous wastes and hazardous constituents, considering, as appropriate: the treatment processes to be used and the amount of hazardous waste and hazardous constituents that will be treated; the degree to which treatment is irreversible; and the types of treatment residuals that will be produced.
3. **Short-term Effectiveness:** Decision-makers should evaluate remedies based on the short-term effectiveness and short-term risks that remedies pose, along with the amount of time it will take for remedy design, construction, and implementation.
4. **Implementability:** Decision-makers should evaluate remedies based on the ease or difficulty of remedy implementation, considering as appropriate: the technical feasibility of constructing, operating, and monitoring the remedy; the administrative feasibility of coordinating with and obtaining necessary approvals and permits from other agencies; and the availability of services and materials, including capacity and location of needed treatment, storage, and disposal services.

5. **Cost:** Decision-makers should evaluate remedies based on capital and operation and maintenance costs, and the net present value of the capital and operation and maintenance costs.
6. **Community Acceptance:** Decision-makers should evaluate remedies based on the degree to which they are acceptable to the interested community.
7. **State Acceptance:** Decision-makers should evaluate remedies should be evaluated based on the degree to which they are acceptable to the State in which the subject facility is located. This is particularly important where EPA, not the State, selects the remedy.

Figures 2 and 3 provide two graphical ways to illustrate and communicate how the decision maker may use the balancing/evaluation criteria to identify the "best" alternative. Figure 2 could be used when more than one alternative is capable of achieving the performance standards, i.e., the alternative that ranks highest under the greatest number of criteria will stand out as a superior solution relative to the others. Figure 3 could be used when you are evaluating just one alternative that was shown to meet the performance standards, i.e., a remedy could be selected based on whether it was found to be "acceptable" under each of the evaluation criteria.

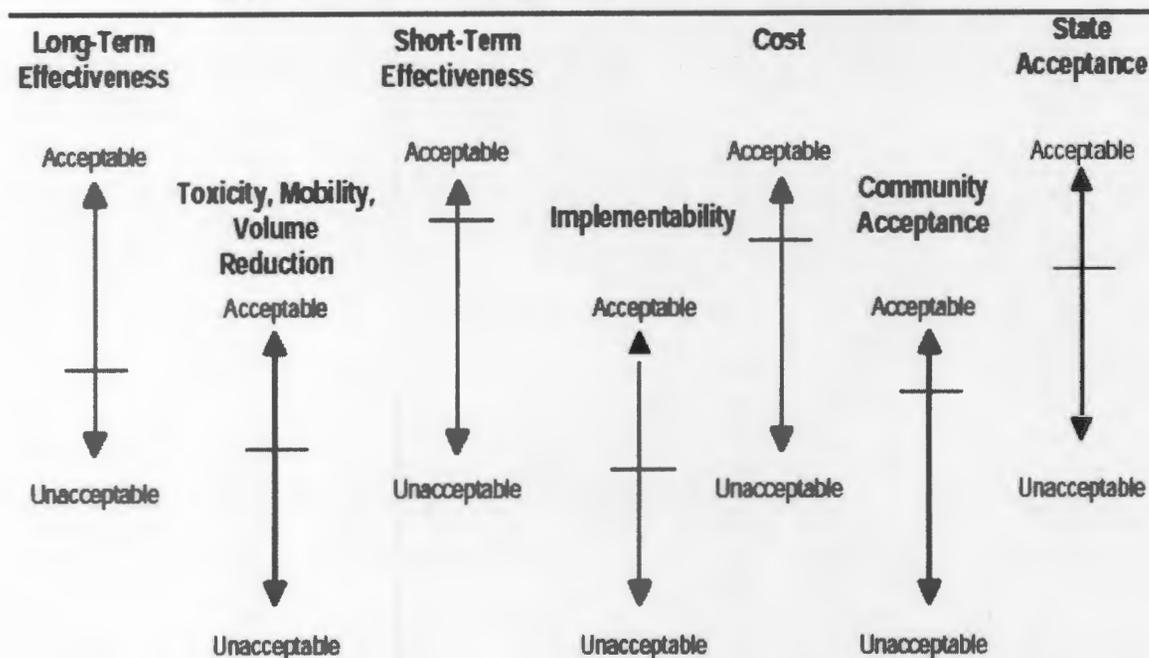
**Figure 2:**

**Tool for Comparative Analysis of Multiple Alternatives**



**Figure 3**

**Approach for Analyzing Single Alternative**



A

Another tool that may help decision-makers identify acceptable remedies is the list of EPA expectations for final remedies at RCRA Corrective Action sites (see March 1999 Corrective Action Workshop Fact Sheet #2 at [www.epa.gov](http://www.epa.gov)). Although remedial expectations are not binding requirements, they can be very helpful during remedy selection because they reflect EPA's collective experience in using the remedy performance standards and evaluation/balancing criteria. They also outline the expectations the lead Agency reviewer will likely apply to a proposed remedial alternative. Remedies that are designed to fulfill these expectations typically will achieve the three final remedy performance standards and perform well with regard to the balancing/evaluation criteria. One of those expectations pertaining to contaminated groundwater is provided below.

**Expectation for Final Remedy Addressing Contaminated Groundwater at RCRA Corrective Action Facilities**

EPA expects to return usable groundwaters to their maximum beneficial uses wherever practicable, within a time frame that is reasonable given the particular circumstances of the site. When restoration of the groundwater is not practicable, EPA expects to prevent or minimize further migration of the plume, prevent exposure to the contaminated groundwater and evaluate further risk reduction. EPA also expects to control or eliminate surface and subsurface sources of groundwater contamination.

## How thorough of an assessment should you conduct when evaluating one or more remedial options?

There are several general rules of thumb that may help you answer this question. First, EPA believes that decision-makers should tailor the evaluation of remedial alternatives based on site-specific circumstances. For example, excavation of a relatively small amount of contaminated media followed by off-site treatment and disposal at a permitted facility would not typically warrant a detailed evaluation. Second, EPA expects owner/operators to evaluate only appropriate, implementable approaches, consistent with expected future land uses. For example, we would not typically expect an evaluation of an option involving excavation, incineration and off-site disposal at an entire 100-acre landfill. Third, decision-makers should only evaluate the number of alternatives necessary to demonstrate the preferred remedy is capable of achieving the three final remedy performance standards and that it was acceptable with respect to the balancing/evaluation criteria. EPA believes that there will be a significant number of facilities where evaluation of multiple alternatives is not necessary because a single approach is found to be acceptable. For example, at a facility where the owner/operator proposes to excavate all the contaminated soil for off-site recycling, treatment or disposal, it may not be necessary to evaluate other alternatives. Similarly, where there are straightforward remedial solutions (e.g., where standard engineering solutions have proven effective in similar situations) or where presumptive remedies ([www.epa.gov/superfund/resources/presump](http://www.epa.gov/superfund/resources/presump)) can be applied, it may not be necessary to evaluate more than one alternative. However, when only one alternative is proposed, the decision maker typically would make one of the following three decisions:

- (1) the alternative is acceptable and will be proposed as the preferred final remedy in the Statement of Basis (or equivalent);
- (2) the alternative could be acceptable with modifications; or
- (3) other alternatives should be presented to allow for a comparison and selection of the best option.

## Do I have to develop a formal report (typically referred to as a Corrective Measures Study or CMS) to document the evaluation of remedial alternatives?

EPA believes that facilities should document their evaluation of remedial alternatives; however, the detail and format of that documentation could vary considerably depending on the site-specific situation. For example, a detailed letter could be sufficient to document a proposal involving small scale excavation and off-site treatment/disposal. A complex site, however, involving a large-scale cleanup would likely warrant a more extensive explanation of a preferred approach along with a comparison to other plausible options. Regardless of the format, EPA believes that the documentation should include an explanation of how the remedy will (1) achieve the three final remedy performance standards, and (2) how well the remedy performs with regard to the balancing/evaluation criteria.

## What are my responsibilities in evaluating and selecting final RCRA Corrective Action remedies?

### Owner or Operator of a Facility

Your primary responsibility is to protect human health and the environment from contamination at your facility. EPA believes you should begin very early in Corrective Action to think about options to address environmental problems at your facility. For example, you should consider remedial options prior to and during site investigations to help focus resources on data needed to justify a recommended remedy. You should identify (and submit to the overseeing regulator) one or more remedial options that you believe are capable of achieving the final remedy performance standards, and recommend the best remedy (in your opinion) based on the balancing/evaluation criteria. You should implement the remedy selected by the overseeing agency and monitor performance to ensure that it is functioning as intended. And, very importantly, you should keep interested members of the public well informed of all Corrective Action activities taking place at your facility. EPA strongly believes that the public will more likely accept a facility's remedy recommendation if they have been involved early and throughout Corrective Action.

### Lead Overseeing Regulator

Your primary responsibility is to serve the public by selecting a final remedy that you believe is capable of meeting the three final remedy performance standards. This responsibility starts with you encouraging the facility owner/operator to fulfill their responsibilities (discussed previously). You should keep in mind that there are a variety of ways to provide that encouragement. For example, requirements to investigate facilities and evaluate remedies are typically included in permits or enforcement orders. However, another option that has been successful at many facilities is simply "asking" the facility owner/operator to conduct and document certain Corrective Action related activities. Of course, you or the facility owner/operator should document, in writing, oral agreements to make sure decision-makers have the same understanding of work to be accomplished, major milestones, public involvement, and level of regulatory oversight. This strategy of informally asking the facility to perform work is most applicable to data collection and evaluations conducted prior to final remedy selection and implementation. Furthermore, such informal agreements typically would work only where there is a willing and motivated facility owner/operator with a good compliance record. For example, there may be many facilities that would like to complete Corrective Action for all or part of the facility to allow redevelopment; such facilities may be anxious to perform work and would rather not wait for an enforcement order or permit to initiate site investigations and evaluations of remedial alternatives. EPA believes the final remedy itself should be captured more formally in a permit or order. Certainly, many situations warrant a more enforceable agreement, but less formal agreements, where possible, have significantly reduced administrative burdens and time. Lastly, when you are relying on less formal approaches, you should make it clear to the facility owner/operator that you reserve the right to use more formal and enforceable approaches if necessary.

Other responsibilities associated with a final RCRA Corrective Action remedy include: conducting a review (as needed) of the facility's evaluation of remedial alternatives; determining whether the facility's remedy recommendation is acceptable with regard to the performance standards and remedy balancing/evaluation criteria; writing a "statement of basis" or equivalent that seeks public input on the rationale for a proposed final remedy; communicating to the public about the final decision in a "final decision/response to comments document" or equivalent; and, ensuring that the facility owner/operator is implementing the final remedy and documents that it is working as

intended. Some examples of key elements to include in the statement of basis and response to comments document are provided below and are presented in more detail in (Directive 9902.6, April 29, 1991).

EPA encourages regulators to recognize that they have a range of options for reviewing a facility's evaluation of remedial alternatives. For example, some regulators do not require the submission or regulatory approval of a Corrective Measures Study or equivalent; rather, they focus on defining clear cleanup objectives and methods to monitor performance, and give significant latitude to the facility owner/operator to identify a remedy that the facility believes can achieve the performance standards. Yet in other situations, regulators have been very active participants providing a detailed review of a formal evaluation of remedial alternatives submitted by the facility.

### **Recommended Elements for the Statement of Basis**

#### **Introduction**

- ✓ facility name and location
- ✓ purpose of document
- ✓ importance of public input

#### **Proposed Remedy**

- ✓ describe proposed remedy

#### **Facility Background**

- ✓ site history
- ✓ summary of investigations
- ✓ summary of interim action

#### **Environmental Problem**

- ✓ describe contaminated media
- ✓ facility risks
- ✓ describe significant uncertainties

#### **Summary of Alternative(s) and Proposed Remedy**

- ✓ performance standards
- ✓ balancing/evaluation criteria

#### **Public Participation**

- ✓ history of public input
- ✓ upcoming public meetings
- ✓ location of file record

### **Recommended Elements for Final Decision/Response to Comments**

#### **Introduction**

- ✓ facility name
- ✓ purpose of document

#### **Selected Remedy**

- ✓ describe selected remedy with respect to performance standards and balancing/evaluation criteria.
- ✓ describe remaining significant uncertainties and how they will be managed
- ✓ describe performance monitoring

#### **Public Participation**

- ✓ describe public participation activities
- #### **Public Comments and Agency Responses**
- ✓ describe comments received from the public, other regulatory agencies, local officials, and the owner/operator of the facility

- ✓ provide Agency's responses to each of the comments received, including changes to the remedy based on the comments

#### **Future Actions**

- ✓ describe approximate schedule for significant activities

Provide declaration signed by a designated Agency official

## **Interested Member of the Public**

Your role as an interested member of the public is vitally important in regard to final remedies at RCRA Corrective Action facilities for two primary reasons. First, it is you and the environment that you live in that the remedy should protect. Second, as described above, "community acceptance" is one of the balancing/evaluation criteria that is used to identify the best final remedy for a particular situation. Therefore, you should become involved! One of the best ways to become involved is to contact the facility owner/operator and the overseeing regulator and ask them to sponsor regular meetings with representatives from the community. EPA has found that the relationships fostered in such meetings often leads to remedies that are acceptable to the parties involved; this is especially true when the meetings are held early and often during the earliest stages of investigations and throughout the cleanup of the facility.

## **Where do I get more information?**

For more information about the RCRA Corrective Action program and the Results-Based Site Management Workshop, visit the Corrective Action Internet home page at <http://www.epa.gov/epaoswer/hazwaste/ca/#wkshp>.

### **End Notes:**

1. This document provides guidance to EPA and States on how best to implement RCRA Corrective Action. It also provides guidance to the public and the regulated community on how EPA intends to exercise its discretion in implementing its regulations. The document does not, however, substitute for EPA's regulations, nor is it regulation itself. Thus, it cannot impose legally-binding requirements on EPA, States, or the regulated community, and may not apply to a particular situation based upon the circumstances. EPA may change this guidance in the future as appropriate.
2. EPA expects to use treatment to address the principal threats posed by a site whenever practicable and cost-effective. Contamination that represents principal threats for which treatment is most likely to be appropriate includes contamination that is highly toxic, highly mobile, or cannot be reliably contained, and that would present a significant risk to human health and the environment should exposure occur.

# ADEQ

ARKANSAS  
Department of Environmental Quality

## Memorandum

TO: HWD Staff  
FROM: Mike Bates, HWD Chief *MB*  
DATE: July 15, 2005  
SUBJECT: Ground Water Remediation Level Interim Policy and Technical Guidance

The Director approved the above referenced documents on July 13, 2005. The documents are attached for your review and use.

A lot of people, in this Division and others, worked on the effort to develop these documents from drafting to review and comments on various drafts. Your efforts are to be applauded.

Some of the concepts and procedures addressed in these documents will be "new" to some Divisions within the Department and since this sets the Department on a common track regarding ground water clean up; the Director has established a one year evaluation period beginning August 1, 2005. The attached Memo sets out certain items that all of the Divisions implementing the Interim Policy / Guidance will need to accumulate over the next year.

If you have any questions about this new Interim Policy & Guidance, please let me know.

attachments:

Director's approval  
Interim Policy on *Ground Water Remediation Levels*  
Technical Guidance on *Development of Ground Water Remediation Levels*

# ADEQ

ARKANSAS  
Department of Environmental Quality

MB

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TO: Marcus C. Devine, Director  
FROM: Ellen Carpenter, Legal Division Chief *EC*  
DATE: July 12, 2005  
SUBJECT: Ground Water Remediation Level Interim Policy and Technical Guidance

The Policy Review Committee (PRC) have reviewed the two documents referenced above and attached to this memo. The PRC recommends adoption of these documents on an Interim basis with a request that the Media Divisions implementing the documents collect certain information (identified below) in order to evaluate the Interim Policy over the next year. Each Media Division will collect this information over the twelve (12) months, beginning August 1, 2005, and then submit a summary of the information to the Chairperson of the Policy Review Committee.

We feel that the Interim Policy and associated Technical Guidance will provide the means to establish more consistent ground waster remediation levels across the Divisions and establish strong defensible criteria in the event the remediation levels are challenged.

### Evaluation Information

- # of suspected & actual GW contamination events (projects) identified
- # suspected events positively confirmed vs # suspected events negatively confirmed
- average length of time GW investigation (start to Plume identification complete)
- # GW Strategies Proposed
  - # using MCLs as remediation goal
  - # using TI
  - # using institutional or engineering controls
  - # using risk management to establish remediation goals
  - # with identified surface water interface
- Summary of problems encountered using Interim Policy & / or Guidelines & how they were resolved
- Suggestions for improvement
- Training needs identified

Approved: *Marcus C. Devine*

July 13, 2005  
Date

Attachments: Interim Ground Water Remediation Levels  
Technical Guidance, Development of Ground Water Remediation Levels

ARKANSAS DEPARTMENT OF ENVIRONMENTAL QUALITY  
INTERIM POLICY  
GROUND WATER REMEDIATION LEVELS

**Background**

The Divisions responsible for oversight of ground water remediation activities within the Department should use consistent methods for establishing ground water remediation levels regardless of the media Division having principal responsibility for the action.

**Policy (INTERIM)**

This policy shall apply to ground water remediation conducted under the jurisdiction of ADEQ. *The goal shall be to protect, enhance, and restore ground water conditions to the maximum beneficial use to the extent technically and economically feasible while maintaining conditions that are protective of human health and the environment.*

Until final regulations are promulgated by the Arkansas Pollution Control and Ecology Commission that are specific to the establishment of ground water remediation levels, such levels will be established on a case-by-case basis. The technical guidance for "***Development of Ground Water Remediation Levels***", attached hereto, shall be utilized as the implementation tool to guide the development of ground water levels in a consistent manner.

The levels or goals for ground water remediation shall be established following:

1. Plume characterization,
2. Determination of source control measures / best management practices to be employed, and
3. Evaluation of risk to human health and the environment.

Consideration will be given to the current and reasonably anticipated future land use (ground water usage).

A proposed site remediation plan (including ground water levels / goals) shall be made available for a thirty (30) day public review and comment period. The proposed site remediation plan may be incorporated as part of a permit decision, enforcement agreement, or similar document. The content of the proposed remediation plan shall include the results of the site investigation, including the ground water plume characterization, identification and summary of source control measures, and the basis for the establishment of the proposed ground water remediation levels. In addition to the public notice typically required (publication in the newspaper of largest circulation in the county) for permitting decisions pursuant to APC&EC Reg. No. 8, a good faith effort shall be made to provide a direct notice to all land owners and tenants that own or lease property that is impacted by the groundwater contamination plume.

Divisions will require that the party responsible for the ground water contamination bear the responsibility and costs of all investigation, remedial feasibility studies, public participation, and remedial implementation when such parties can be identified.

Rev. # - 00

-10/ #04- *7/15/05*  
*DATE TO BE REPEATED*

Approved: \_\_\_\_\_  
Director

Date: \_\_\_\_\_



# ADEQ

ARKANSAS  
Department of Environmental Quality

## TECHNICAL GUIDANCE

# DEVELOPMENT OF GROUND WATER REMEDIATION LEVELS

## I. Statement of Purpose

This document provides for the application of a consistent process for the establishment of ground water remediation levels or goals. ADEQ will utilize this process unless modified by the Director based on the best interest of the citizens of Arkansas. This document outlines the basic components ADEQ will require during the investigation and remediation of ground water contamination regardless of the source of the contamination.

## II. Definitions

- **Best Management Practices (BMPs)** – Schedules of activities, prohibited activities, maintenance procedures and management practices that prevent or reduce pollution of waters of the state.
- **Ecological Hazard Quotient** – A quotient used to assess risk in which protective assumptions are used. Generally, the numerator is the reasonable worst-case constituent concentration at the point of exposure (e.g., Exposure Estimate), and the denominator is the no-adverse effects-based toxicity reference value (e.g., Effects Benchmark).
- **Engineering Controls** – Engineered structures, such as a clay cap, French drain, or slurry wall that is designed and installed to contain or minimize contaminated ground water migration.
- **Extent of Contamination** – The maximum horizontal and vertical limits of ground water pollution as defined by the concentration of chemical constituents above background concentrations.
- **Ground Water Contamination** – Pollution [as defined at A.C.A. § 8-4-102 (6)] of any waters of the state below the surface of the ground.
- **Hazard Index (HI)** – The sum of hazard quotients used in the evaluation of non-cancer human health risk.
- **Hazard Quotient (HQ)** – Non-cancer human health risk expression based on the calculated exposure of a single contaminant in a single medium divided by the reference dose.
- **Institutional Controls (IC)** – Non-engineered instruments, such as administrative and/or legal controls that minimize the potential for human exposures to contamination by limiting land or resource use.

## Development of Ground Water Remediation Levels

- **Maximum Beneficial Ground Water Use** – The maximum (or highest) beneficial ground water, within the range of reasonably expected uses.
- **Maximum Contaminant Levels (MCLs)** – Federally promulgated and enforceable standards that set forth the maximum permissible level of a contaminant in water which delivered to any user of a public water system.
- **Maximum Contaminant Level Goals (MCLGs)** – Non-enforceable public health goals which establish the maximum level of a contaminant in drinking water at which no known or anticipated adverse human health effect would occur, and which allows for an adequate margin of safety.
- **Point of Compliance** – The point or boundary at which ground water should be monitored for quality and where ground water remediation levels are to be achieved. The vertical surface, extending downward to the uppermost aquifer, located horizontally and, hydraulically down gradient of the contaminant source. (Note: Multiple points of compliance may be established when responding to complex or extensive ground water contamination events, e.g. when short-term protection goals or interim measures are incorporated into a remediation plan.)
- **Remediation Criteria** – All site specific response objectives including details of remediation, e.g. soil cleanup levels, institutional controls, engineering controls, surface water discharge requirements, ground water cleanup levels, etc.
- **Source Control** – Any remedial action, interim measure, or institutional control designed to prevent, eliminate, or contain the migration of pollution from its initial point of disposal or entry into the environment.

### III. Process

1) The goal for the use of this guidance shall be to *protect, enhance, and restore* ground water conditions to the maximum beneficial use to the extent technically and economically feasible while maintaining conditions that are protective of human health and the environment. It is the policy of ADEQ that, until final regulations are promulgated by the Arkansas Pollution Control and Ecology Commission that are specific to the establishment of ground water cleanup standards, the cleanup levels or goals will be established on a case-by-case basis in a consistent manner. To this end, the process set forth below shall be utilized by ADEQ:

#### (a) Plume characterization

The ground water pollution (contamination) plume shall be fully characterized as to:

1. The extent of contamination,
2. The contamination source(s),
3. Ground water flow direction,
4. Ground water gradient,
5. Ground water velocities,
6. Hydrogeologic units or formations impacted, and
7. Hydrologic connectivity between units.

#### (b) Source Control Measures / Best Management Practices

## Development of Ground Water Remediation Levels

Technological, chemical, or biological methods (or combinations thereof) must be implemented to control the continued migration of pollution from the source. The following hierarchy shall be utilized, to the extent practicable, when selecting appropriate source control measures / practices:

1. Removal (excavation),
2. Physical barriers
3. *In situ* treatment

(Note: All source control measures / best management practices must be implemented with appropriate and adequate follow-on monitoring to determine the effectiveness of the measures.)

### (c) Ground Water Cleanup Strategy

The ground water remediation levels shall be established following:

1. Plume characterization,
2. Determination of source control measures / BMPs to be employed, and
3. Evaluation of risk to human health and the environment.

Consideration will be given to the current and reasonably anticipated future land use (including ground water usage).

The party implementing the response to a ground water contamination event shall prepare a proposed site remediation plan for ADEQ review. Following determination of technical adequacy by ADEQ, a proposed site remediation plan (including all remediation criteria to be applied to the site) shall be made available for public review and comment. Content of the proposed remediation plan shall include:

1. The results of the site investigation, including the ground water plume characterization,
2. Identification, and summary of source control measures / BMPs,
3. The basis for the establishment of the proposed remediation criteria, and
4. The minimum frequency for ADEQ monitoring of the progress and effectiveness of the remediation.

The proposed site remediation plan may be incorporated as a part of a permit decision, enforcement agreement, or other similar document. The public notice of the proposed site remediation plan shall follow the procedures typically required for ADEQ permitting actions (publication in the newspaper of largest circulation in the county). In addition, a good faith effort shall be made to provide a direct notice to all land owners and tenants that own or lease property that is impacted by the ground water contamination plume.

ADEQ shall consider all relevant comments submitted during the comment period, revise the remediation plan as appropriate, prepare a Response to Comments, and issue a final decision regarding the site remediation plan.

### 2) Ground Water Remediation Criteria Establishment

Remediation criteria for protection of human health should use existing regulatory standards (e.g., drinking water standards) when such are available and necessary to protect a current

## Development of Ground Water Remediation Levels

or reasonably anticipated future ground water use. Other factors that must be considered when developing site-specific ground water remediation criteria include:

- **Background Ground Water Quality** – the quality of the ground water in proximity to the site that is unaffected by the release.
- **Maximum Beneficial Ground Water Use** – within the range of reasonably expected uses, the maximum (or highest) beneficial ground water use warrants the most stringent ground water cleanup levels.
- **Ground Water Use Designation** – use designation as established by the Arkansas Soil and Water Conservation Commission and / or the APC&EC.
- **Actual Ground Water Use** – use(s) of ground water being employed in the immediate vicinity of the site or study area.
- **Maximum Contaminate Levels (MCLs) / Maximum Contaminate Level Goals (MCLGs)**
- **Ground Water Discharge to Surface Water**
- **Best Management Practices**
- **Technical Feasibility** – achievement of the proposed cleanup levels / goals practicable from an engineering perspective.
- **Human Health and Environmental Risk** – actual and potential relative risk to human health and ecosystems based on exposure pathway(s) and constituents available for exposure.
- **Point of Compliance**

### 3) **Acceptable Risk Range**

This guidance does not require the use of a specific risk assessment methodology. However, any risk assessment approach that is utilized must:

1. Identify the Constituents of Concern (CoCs);
2. Establish the toxicity of each CoC;
3. Identify and evaluate all potential and actual Exposure Pathways;
4. Identify all potential and actual Receptors (human health and ecological); and
5. Evaluate the potential and actual effects or CoC exposures on each receptor.

Remediation levels for protection of human health should use existing regulatory standards (e.g., drinking water standards) when such are available and necessary to protect a current or reasonably anticipated future ground water use. If promulgated standards are not utilized for establishing the remediation criteria, a risk assessment will be conducted or utilized to evaluate and establish acceptable risk management-based remediation criteria.

In the absence of existing, promulgated standards or in cases where the designated use differs from the actual or reasonably anticipated use; the remediation standard may be based

## Development of Ground Water Remediation Levels

on an acceptable risk range. The acceptable risk range shall be based on protection of human health and the environment.

Remediation levels established for **human health** protection will be based on concentrations that represent an excess upper bound lifetime risk (for known or suspected carcinogens) between  $10^{-4}$  and  $10^{-6}$ . In addition, non-cancer risk shall be based on levels of contaminants that are equal to or below a HQ of 1; or, for sites with multiple contaminants, a HI equal to or below 1.

Remediation levels established for **ecological** protection will be based on concentrations that represent an ecological risk characterization above an ecological HQ ratio. Typically, a HQ or HI should be less than 0.25. This level is conservatively chosen to account for exposures due to background conditions (i.e., naturally occurring substances like metals and sources of regional pollution). If the HQ or HI is greater than 0.25, a more detailed ecological risk assessment may be needed to better define the potential risk, if any.

### IV. Tracking and Monitoring

All remedies that establish ground water levels or goals above background quality shall be reviewed by the ADEQ Division overseeing the ground water remediation (at a minimum) once every five (5) years from the date of remedy implementation. The purpose of these reviews is to determine if remedy / ground water cleanup levels remain protective of human health and the environment. The review will also document the status of any IC required by the remedy selection.

All ICs that are implemented as part of a remedy selection will be recorded in a data base (to be established or identified). Until such time as an IC Tracking data base is established, each Division conducting or overseeing ground water remediation shall document, at a minimum, the following information:

- Site or Project Name
- Legal Description (including latitude / longitude coordinates)
- AFIN
- Constituents of Concern
- Type of IC Required
- Party responsible for maintaining the IC

### V. Inter- / Intra-Agency Coordination

The establishment of ground water remediation levels or goals is a process that must be highly coordinated due to the layers of authorities and jurisdictional issues. All ADEQ Divisions charged with the oversight and / or response to issues of ground water contamination shall communicate and coordinate with the appropriate ADEQ Division(s) and / or other State Agencies to insure that appropriate and legally defensible levels are established. Below is a summary to be used as a guide for proper coordination on ground water remediation levels issues:

## Development of Ground Water Remediation Levels

- Arkansas Soil and Water Commission – Ground water use designation, non-point source issues.
- Arkansas Department of Health – Human-health exposures.
- ADEQ Water Division – Water quality, discharge criteria.
- ADEQ Hazardous Waste Division – Hazardous substance / hazardous waste issues, risk assessment / risk management assistance.
- ADEQ Regulated Storage Tank Division – Petroleum only ground water contamination issues.
- ADEQ Environmental Preservation Division – Review of all environmental projects (including remedy decisions).

Approved: \_\_\_\_\_  
Director

Date: \_\_\_\_\_

