

SUBMISSION INSTRUCTIONS NO. 17

**DESIGN OF A CORRECTIVE ACTION PLAN (CAP)
CONCERNING GROUNDWATER CONTAMINATION
AT REGULATED
SANITARY, CDD, AND INDUSTRIAL LANDFILLS**

Developed by

**Virginia Department of Environmental Quality
Office of Waste Permitting
Groundwater
629 East Main Street
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07/14/03

1.0 APPLICABILITY OF INSTRUCTIONS

These instructions are applicable to all solid waste facilities conducting groundwater monitoring under the requirements of the Virginia Solid Waste Management Regulations (VSWMR), promulgated by the Virginia Waste Management Board, December 21st, 1988, as amended.

As directed under 9 VAC 20-80-310.B, a Permittee must choose a remedy and present that choice to the Director in a written Corrective Action Plan (CAP). These Submission Instructions have been designed to address the technical content expected of a CAP.

2.0 INTENT OF INSTRUCTIONS

After submission of an Assessment of Corrective Measures (ACM), the Permittee is required to submit a written CAP detailing how the chosen remedy will meet the requirements of 9 VAC 20-80-310.B.2. These instructions have been developed to assist the Permittee in developing a CAP. These instructions are generally consistent with and have been modeled after sources including:

- RCRA Correction Action Plan (Final) [EPA 520-R-94-004],
- Corrective Measures for Releases to Groundwater from Solid Waste Management Units [EPA 530-SW-88-020],
- Corrective Action: Technologies and Applications [EPA 625-4-89-020]
- A Comparison of the RCRA Corrective Action and CERCLA Remedial Action Processes [DOE/EH-0365],
- RCRA Corrective Action & CERCLA Remedial Action Reference Guide [DOE/EH-0001],
- “Draft” Handbook of Groundwater Policies for RCRA Corrective Action [EPA 530-D-00-001].

Since many of these sources were developed for RCRA Subtitle C and/or NPL facilities, the Department has utilized them as a means of identifying data types and comparative methodologies that have previously proven successful in completing ACM investigations.

It is important to note that other data or reporting requirements contained in the sources listed above, which are not deemed applicable to the activities required under 9 VAC 20-80-310, have not been made part of these instructions.

These submission instructions are an outline of the *minimum* technical content to be included in the CAP. These instructions have been developed as guidance, not a rule. They have not gone through public comment. Therefore, they may be altered to fit facility-specific conditions where needed.

3.0 BENEFITS OF INSTRUCTIONS

The Department believes developing CAP submission guidelines will:

- assist the regulated community with preparing a technically complete plan,
- provide the minimum requirements of technical content of a written plan, and
- reduce the chance the plan will be judged to need subsequent modification.

4.0 REPORT FORMAT

At a minimum, the written CAP shall address each of the information topics noted in these instructions and, except as noted below, shall follow the section format outlined in Table 1 of these instructions. The sections listed herein shall be considered standard technical content. CAP submissions that are found to lack such content may be judged incomplete during technical review.

The Department notes that there may be some site-specific instances where technical data may require additional information beyond that listed in these submission instructions as a means of more fully characterizing the technical data available and conclusions derived from that data. These instructions set no limit on the number or topical content of such additional report sections as long as the information included pertains to that required of a CAP.

The administrative and technical content to provide in each section of the CAP is briefly described on the following pages.

Cover Page – Provide the following information:

- Landfill Name
- Landfill location
- DEQ Permit #
- DEQ Region
- Name & Address of the Consultant
- Name & Address of the Permittee
- Report Date

Signature Page – This page should contain the signature & seal of a qualified groundwater professional certifying the content of the CAP.

If the CAP contains a designed remediation system, the Department strongly suggests that the design of such a system be certified by a Professional Engineer (P.E.) following common industry practice. In instances where a designed system will be used as part of the remedy chosen for the site, it is the responsibility of the Permittee to implement a designed system which can be shown to meet the requirements of subdivisions 2.a, 3.a(3), 3.a(4), 3.a(6), 3.a(7), 3.c, and 3.d of section 310.B of the VSWMR.

Table of Contents – Specify the order and organization of the report sections as outlined in Table 1 of these instructions.

Executive Summary – Provide a brief summary of the following:

- Description of the extent of the groundwater release.
- Summary of the contaminants of concern.
- Summary of the remedy chosen for corrective action.

Introduction – Define the purpose of the CAP as being to:

- Present a site-specific remediation plan able to be protective of human health and the environment, able to attain the groundwater protection standard, control the source of the release, and comply

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with applicable state and federal standards for the management of solid waste.

The CAP must be based on, and supported by, data gathered during the NES/ACM. The CAP must take into account any technical comments the Department may have issued following a review of the NES/ACM.

The Permittee must state that the CAP was submitted in a format consistent with these submission instructions and applicable reference(s) in the VSWMR. Describe any report limitations (company specific language), as well as definitions for any technical or laboratory terminology used in the report.

Site Description – Since this topic is covered in detail in the NES and ACM, the CAP should only contain a brief summary of the site location, monitoring well network, hydrologic conditions affecting contaminant migration, and a listing of potential receptors on site.

Physical Setting Information

- Identify facility on USGS 7 ½-minute topographic map
- Include copy of the topo map as a Figure in the CAP
- Identify adjoining land use types
- Identify possible risk-receptors on site

Aquifer Recognition

- Identify the nature of the impacted aquifer
- Identify any structural controls to contaminant migration
- Summarize the constituents of concern
- Include a Potentiometric map as a Figure in the CAP

Monitoring Well Network

- Identify each well on a facility site plan included as a Figure in the CAP
- Denote which wells are compliance wells, which wells are sentinel wells, and which wells are performance wells (if applicable)

Site Receptors

- Surface Water (including aquatic animals and plants)
- Human
- Animal

Site Remedy – Summarize the remedy chosen and the factors supporting the decision. Describe how the remedy will be:

- protective of human health and the environment,
- able to attain the groundwater protection standard,
- control the sources of the release,
- meet standards for the management of solid waste, and
- meet each of the requirements of 9 VAC 20-80-310.B.3.

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The site remedy must not allow site conditions to develop, or where currently present, to continue in violation of Title 62.1 – 44.5 of the Code of Virginia, or Title 10.1 – 1409 of the Waste Management Act regarding surface water impact.

This section of the plan must also detail the following possible site contingencies:

- If the remedy chosen for the site can not be implemented in a timely manner, or other such site conditions exist which require immediate action, the Permittee should include a discussion of appropriate interim measures that meet the criteria under *9 VAC 20-80-310.C.1.c* to be implemented prior to CAP approval.
- After implementation of the CAP, if site specific data shows that the selected remedy can not achieve the required clean-up standards, the Permittee must define what additional method will be implemented as an “alternate” remedy to meet the requirements of *9 VAC 20-80-310.C.2*.

Project Schedule – The CAP must provide a general timeline or schedule. Trigger dates must start the date the Permit is amended to include the Corrective Action Plan.

For each of the applicable topics listed below, the timelines should be based on the criteria under *9 VAC 20-80-310.B.4* and be referenced as: “within ___ days of concluding actions related to ___, ___ will be completed, etc.”.

- the initial site work phase
- the engineering/design phase
- pilot studies (if applicable)
- remedial system completion phase
- onset of remediation
- performance monitoring schedule
- anticipated date for completion of site remediation

Remedy Design – The CAP must describe the design of the remediation system, if applicable, including all technical functions and specifications of the components of the remedial system.

All features associated with the remediation system shall be included on the site plan and included as Figure(s) in the CAP. Facilities implementing a “passive” remedy such as Monitored Natural Attenuation may find this CAP section may be shortened to a discussion on the monitoring points and monitoring constituents to demonstrate the effectiveness of the remedy.

Remedy Implementation – For active remedial systems, the CAP must provide a description of the remedy start-up procedure, including any operational testing or pilot studies, and any regulatory Permits which are required to be obtained as a result of operation of the system.

Operations & Maintenance – Describe the Operations & Maintenance (O&M) plan for the remedial system on site. The O&M plan must at a minimum outline the procedures for:

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- performing operations,
- long term mechanical maintenance,
- monitoring of the site equipment associated with the remedial measure, and
- the name(s) and contact numbers for those critical site personnel on whom responsibility for overseeing the O&M operations will fall.

The O&M plan must specify that in the event of the discovery of any deficiency or failure of the operating system, the Permittee will notify the Department within 24 hours of the discovery and provide a written report documenting the cause of the deficiency or breakdown within 15-days of the Permittee completing repair actions.

The complete O&M plan shall be attached as an Appendix to the CAP. Facilities implementing monitored natural attenuation may find this report section needs only to discuss the maintenance of the monitoring wells.

Corrective Action Monitoring Program – The CAP must include an update to the facility’s groundwater monitoring plan (GMP) which takes into account any additional wells installed on site as monitoring points in conjunction with the NES/ACM and or CAP.

The Corrective Action Monitoring Program (CAMP) may include as many as three different well networks:

- A compliance network, monitoring for the Assessment or Phase II monitoring program constituents,
- A sentinel well network which may monitor for the contaminants of concern at sensitive receptors, and
- A performance network which may monitor for contaminants of concern, as well as any additional constituents which are industry-accepted methods by which Monitoring Natural Attenuation or enhanced bioremediation are evaluated.

It is possible that an individual well may serve more than one purpose. The number and spacing of wells utilized in a performance network must be based on site-specific groundwater flow-rate conditions. For any CAP based on Monitored Natural Attenuation, or enhanced bioremediation, the wells should not be spaced at a linear distance which exceeds an anticipated five year groundwater flow path unless site conditions warrant (i.e., stable or decreasing plume). The number and location of sentinel wells should be based on the location of any sensitive site receptors, proximity of the plume to the permitted facility boundary, or an off-site boundary established during the NES.

The CAMP must describe the function of each network, the frequency of groundwater monitoring, and the list of the constituents to be sampled. The compliance network must at a minimum must meet the criteria of the associated monitoring program (i.e., Assessment or Phase II) as required under 9 VAC 20-80-310.A.2 while the performance and sentinel (if applicable) networks must meet the criteria of 9 VAC 20-80-310.C.1.a. (2) and (3), and 9 VAC 20-80-310.A.2.a and b.

It is preferred that the full CAMP document be added as an Appendix to the written CAP, or that this section of the CAP contain a simple summary of the monitoring

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system, frequency, and constituent list and a references the CAMP noting that a copy of the document will be inserted into the facility's permit as an attachment to Permit Module XV (15).

As required under the VSWMR, the updated CAMP must be complete, and inserted in the facility's Permit prior to the actual initiation of the remedial action as outlined under 9 VAC 20-80-310.C.1.b. The CAMP should be submitted to the Department at the same time, or very soon after, submission of the CAP.

Scheduled Performance Evaluation – The CAP shall state how the Permittee will illustrate that the remedial action is performing as designed. This scheduled evaluation must be submitted in report form, titled "Corrective Action Site Evaluation" (CASE) on at least a semi-annual basis and shall include, at a minimum, technical information sufficient to address the specific VSWMR concerns (9 VAC 20-80-310.B) noted below.

Specific Performance Evaluation Topics

- Has the remedial action shown the ability, or potential ability to achieve clean-up standards at the point of compliance based on site specific groundwater quality data?
- Has the remedial action shown operational reliability based on site specific operational logs?
- Has the remedial action remained on schedule, based on that proposed in the CAP?
- Has the remedial action demonstrated protectiveness of Human Health & Environment (HHE)?
- Has the remedial action shown any negative impact to safety of site personnel?
- Has the remedial action shown any negative impact to other media (air, soils, etc.)?
- Has the remedial action generated "residuals" that are more hazardous to HHE than the original constituent(s) of concern?
- Has the remedial action met the anticipated start-up, and O&M costs as defined in the ACM?

Specific Performance Criteria Topics

- Summary of the most recent groundwater quality sampling event and the corresponding results with a note on any statistical trends in concentration data.
- Summary of the most recent groundwater elevation data with respect to monitoring well network functionality
- Summary of the most recent lateral and vertical plume boundaries as shown on a potentiometric surface map.
- Summary of the amount, quantity, or characteristics of any residuals generated as part of remedial actions, as well as a discussion on the disposal (release) method for such residuals.

The CAP shall note that the CASE reports shall be signed by a qualified groundwater professional and must be submitted to the Department no later than 180-days after the corresponding groundwater sampling event; unless an alternate schedule is established in Module XV (15) of the facility's Permit. Where timeframes may conflict

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between those in the CAP and those in the Permit Module, the Permit Module requirements will have precedence.

If the CASE reports show that, over a sufficient amount of time, the selected remedy can not achieve the clean-up standard, the Permittee must implement other remedial methods or techniques as required under 9 VAC 20-80-310.C.2. These secondary actions should be listed under a CAP section titled Alternate Remedial Methods and must meet or exceed the requirements under 9 VAC 20-80-310.C.3.

Public Participation Plan – The CAP shall provide a location near the facility where a data repository will be established to meet the requirements of the 9 VAC 20-80-310 A 5. The data repository should, at a minimum, contain the following documents, delivered within 30-days of becoming available:

- A copy of the amended Permit.
- The NES/ACM.
- The CAP.
- Copies of each CASE report.
- Copies of any reports documenting the completion of Corrective Action, or any proposal to alter the remedy chosen in the original CAP.
- Copies of any public notices related to the CAP.
- Transcripts of any public meetings related to the implementation or alteration of the CAP.

It is the sole responsibility of the Permittee to maintain a complete set of Corrective Action documentation at the public repository.

The CAP shall also identify the name, address, and phone number of a facility Contact Person to which questions from the general public may be submitted. The contact person shall be knowledgeable of site conditions, concerns, and all aspects of the corrective measure selected as a site remedy.

Completing Corrective Action – The CAP must include a description of the actions that will be undertaken, and information which will be submitted to meet the requirements of 9 VAC 20-80-310.C.5 and 6 if the Corrective Action Monitoring Program indicates there have been no groundwater protection standard exceedances for a period of three consecutive years.

References - List all materials used during the ACM process.

Figures – Provide at a minimum, copies of the:

- USGS 7 ½-minute topographic map showing the site location.
- Potentiometric surface contour and groundwater flow direction map with arrows showing flow direction for those sites with an aquifer type other than fractured bedrock.
- Site Plan with each well network and the area of the waste management unit(s) delineated.

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Appendices – Provide at a minimum, copies of the following:

- Corrective Action Monitoring Program
- Remedial System Operations & Maintenance Plan

5.0 SUBMISSION TIMELINES

If a submission schedule has not been included in the ACM, the Department requests that a CAP, containing an active, engineered, remedy be submitted no later than 180-days from the conclusion of the Department's ACM review. Those CAP's developed or based on actions that do not require the construction of an engineered system (i.e., monitored natural attenuation, enhanced bioremediation, etc.) should be submitted within 120-days of the conclusion of the Department's ACM review.

6.0 EXTENSIONS FOR SUBMISSIONS

9 VAC 20-80-310.B does not contain a timeframe for submission. However, generally the time allowed for CAP submission after department review of the ACM or PPR shall not exceed 180 days. If the ACM or PPR contains adequate details for a shorter timeframe, then the 180-day submission should be shortened. An extension for good cause may be requested if needed by the permittee.

7.0 DEPARTMENT REVIEW

9 VAC 20-80-310.B.5 requires the Director issue approval to the CAP before the CAP can be implemented on site. Based on the Department review, the Director may ask for technical modifications to the CAP, modifications to the timelines listed in the CAP, or may determine that no corrective action is warranted. If modifications are requested, the Permittee must meet the timelines established for resubmission of the amended material(s).

Where no deficiencies in technical content of the CAP are noted, the Department will instruct the Permittee that the CAP is technically complete, and will initiate the opening of the public participation period for the related Permit amendment.

8.0 AMENDING A PERMIT TO IMPLEMENT A CAP

The VSWMR requires the CAP be inserted into the facility's Permit through a major amendment. As such, at the same time the CAP is submitted, the facility must submit the required Permit amendment fee to the address shown below:

DEQ – Receipt Control
PO Box 10150
Richmond, VA 23240

TABLE 1.

Example Table of Contents for Corrective Action Plan

(final table of contents will be determined by site specific conditions/information)

- 1.0 Executive Summary**
- 2.0 Introduction/Regulatory Requirements**
- 3.0 Site Description**
 - 3.1 Physical Setting
 - 3.2 Aquifer Recognition
 - 3.3 Monitoring Well Network
- 4.0 Site Remedy**
 - 4.1 Remedy Design & Specifications
 - 4.2 Remedy Implementation
 - 4.3 Project Schedule
 - 4.4 Operations & Maintenance Plan
- 5.0 Corrective Action Monitoring Program**
 - 5.1 Corrective Action Monitoring Well Network
 - 5.2 Groundwater Constituent List
 - 5.3 Groundwater Sampling Frequency
- 6.0 Performance Evaluations**
 - 6.1 Evaluation Topics
 - 6.2 Criteria Topics
 - 6.3 Corrective Action Site Evaluation (CASE) Report Submittals
 - 6.4 Implementation of Alternate Corrective Methods
- 7.0 Public Participation Plan**
 - 7.1 Reports Available for Public Review
 - 7.2 Location of Public Repository
 - 7.3 Site Contact Information
- 8.0 Completion of Corrective Action**
- 9.0 References**
- 10.0 Figures**
- 11.0 Appendices**